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ABSTRACT

This resource book results from a National Endowment for the Humanities Summer Institute for 30 teachers conducted in 1992 at the University of Illinois at Chicago. Curriculum materials developed were field-tested the following school year. Divided into three sections, part 1, "Essays," contains the following chapters: (1) "Maps in the Context of Time: The Historian's Contribution to Cartographic Literacy" (Gerald A. Danzer); (2) "The Center of the Earth: World Maps and Point of View Analysis" (Mark Newman); (3) "Islamic Maps in the Context of Western Civilization" (Kathleen Borghoff); and (4) "The Debate over Global Projections" (Raymond M. Brod). Part 2, "Lessons and Units," contains the following chapters: (1) "Early Civilizations in the Ancient Near East" (John Mullins); (2) "The Earliest World Map" (Victoria Goben); (3) "World Maps and World Views before Columbus" (Victoria Goben); (4) "Ancient and Medieval Maps for Classroom Discussion" (Charles Hart); and (5) "Mapping in Grades 5 and 6: Suggestions for a Unit" (Roger Anna). Part 3, "Urban Perspectives and Local Applications," contains the following chapters: (1) "Cities of the World: Cartographic and Historical Perspectives" (Charles Hart); (2) "The World in Our City: Ethnicity in Chicago" (Margaret Kania); and (3) "The History of Cicero Township: Cartographic Perspectives" (Charles E. Samec). Appendices offer additional maps and suggestions on how to use them in the classroom. (EH)

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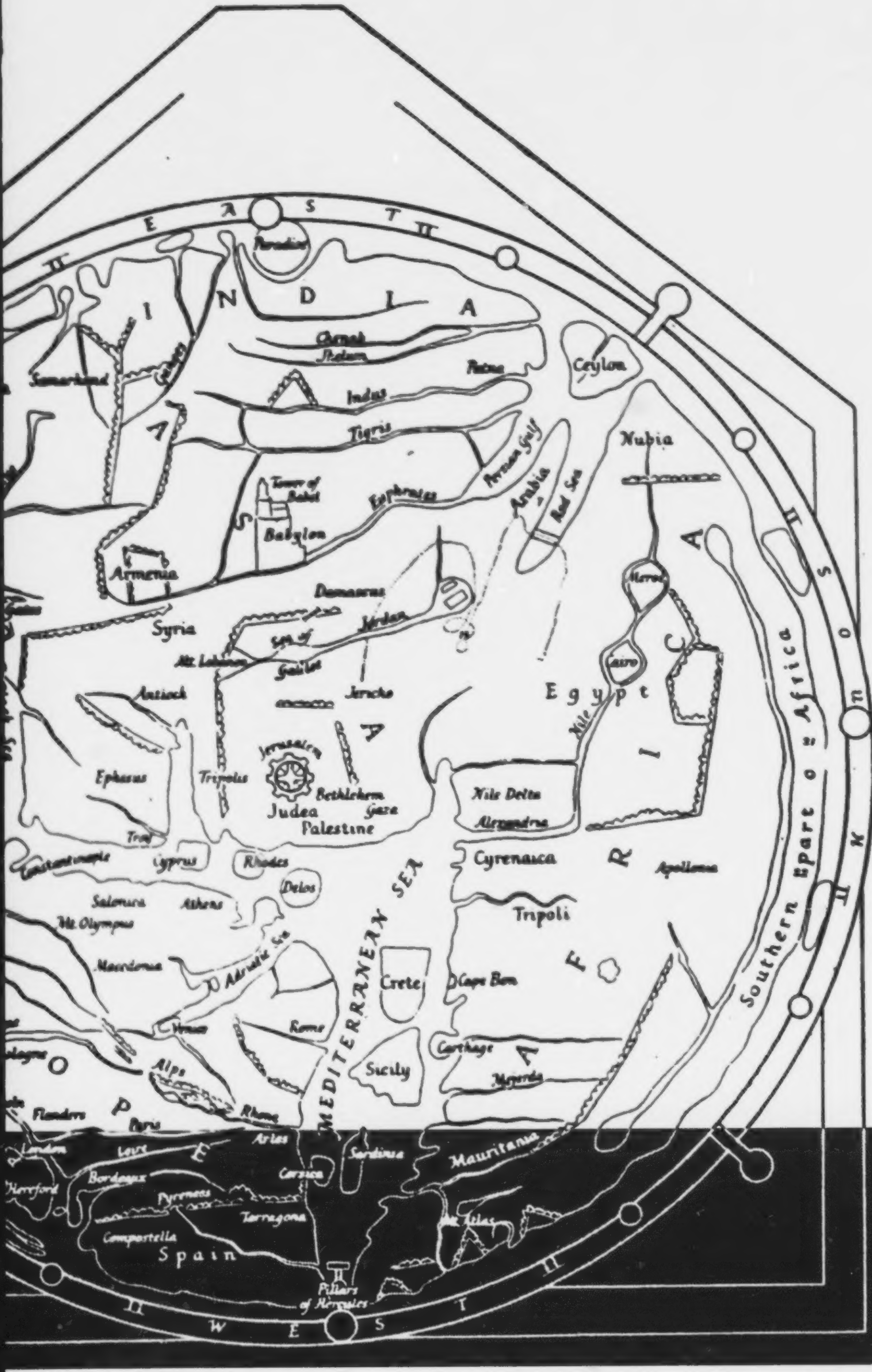
Source Maps and the Social Studies

Essays, Lesson Plans, and Materials From Cartographic Traditions in Western Civilization

edited by
Gerald A. Danzer
and Jacqueline Wolf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Damascus
Syria
Jordan
Sea of Galilee
Mt. Lebanon
Antioch
Jericho
Egypt
Nile
Jerusalem
Ephesus
Tripolis
Bethlehem
Judea
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Palestine
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Mauritania
Bordeaux
Pyrenees
Tarragona
Hereford
Compostella
Spain
Mt. Atlas
Pillars of Hercules
WEST
SOUTH
Southern Part of Africa

The University of Illinois at Chicago World History Project
1993

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Source Maps and the Social Studies:
Essays, Lessons Plans, and Materials from Cartographic Traditions in Western Civilization

edited by Gerald A. Danzer and Jacqueline Wolf

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Introduction

"Cartographic Traditions in Western Civilization," a summer institute funded by the National Endowment for the Humanities, brought thirty teachers to the University of Illinois at Chicago. They spent July 1992 exploring maps, from the earliest surviving examples to the most recent computer-assisted designs. Each image was studied in depth, becoming a window through which participants observed past societies whose collective legacy is something we call Western Civilization. Looking intensely at cartographic texts led quite naturally to new levels of understanding concerning maps, history, and the instructional process.

Curriculum materials developed during and after the summer institute were used in various classrooms throughout the 1992-1993 school year. Reports on the results of these lessons and reflections on the use of old maps in instruction were given at several professional meetings in 1993. Printing some of the materials produced during the Cartographic Traditions project seemed a natural way to maintain interest in and supply information about the effort to the profession.

Jacqueline Wolf, a talented graduate student in the Department of History at UIC, shepherded the publication through the various stages of production. Special thanks are due to HarperCollins Publishers of New York and the National Council for the Social Studies in Washington, D.C. for permission to use or adapt illustrations which appeared earlier in their publications. A final word of thanks is due our sponsors, the National Endowment for the Humanities and the University of Illinois at Chicago.

In teaching and learning the first word is never the last. We offer this collection in the hope that it will encourage continuation of the conversation on how cartography can inform the teaching of history.

Gerald A. Danzer
February, 1994

PART I: Essays

Chapter One

Maps in the Context of Time: The Historian's Contribution to Cartographic Literacy

Gerald A. Danzer

"Everything," the professor told his students, "must be placed in a context, especially the context of time." Does the dictum apply to maps as well? Yes, and this realization is the historian's major contribution to cartographic literacy.

Historians use maps in two distinct ways we might label (1) primary and (2) secondary sources. When a professor shows the class a *mappae mundi* made in the twelfth century and uses it to illustrate the medieval view of the world, he or she is treating the map as a text, a voice from the past that students are encouraged to engage in discourse. The map functions as a primary source. In the same classroom a student report might refer to a map in the textbook to show the location of certain cathedrals, a route of pilgrimage in Northern Italy, or the pattern of forests and cleared land in the Rhine Valley. These maps function as secondary sources.

With a bit of mental gymnastics, students can be encouraged to suggest situations in which the same map could be used as both a primary and a secondary source. Even a modern map showing Europe during the high middle ages takes on the character of a primary source if used to document the history of teaching or textbooks.

When students learn to look at every map as a text drawn by someone to transmit information, ideas, and values to a particular audience, they will have unlocked one of the great doors to cartographic understanding. To help students find this key it is often helpful to look, in very general terms, at the process by which knowledge is transmitted from teacher to student or from cartographer to map reader. The map as a text is situated between the two individuals. It is the medium that connects one mind with the other. But the connection is not perfect; the transmission is subject to interference, miscommunication, and consequent loss of clarity.

Perhaps you can recall a personal example, drawn from your own classroom experiences, of gross miscommunication between a teacher as the transmitter of knowledge and a particular student as the intended receiver—a story of the transfer of culture gone haywire. Consider using the incident as a pedagogical tool. After relating the story to a class, encourage the students to distinguish between the denotation and the connotation of the words and symbols used. Then, with the story in mind, apply its general principles to cartography. Each symbolic element on a map has a specific denotation hopefully understood in the same way by its maker and its readers. If there is any discrepancy here, the process of communication starts to unravel. Gross examples of misunderstanding may evoke belly laughs rather than quiet smiles.

An incident that evokes only quiet smiles often involves divergent connotations brought to the text rather than a breakdown at the denotation stage. Although most of us enjoy a good laugh on occasion, it is this "smile category" that will help students the most in dealing with primary sources of any type. "Now that we have read the text," the professor announces, "let us investigate what the person who wrote it really meant, what he or she wanted to accomplish through this document, and why it may have significance for us." In other words, what are the connotations of the words and symbols on the map? What meaning did the map have for its maker and the audience in its original or primary situation?

Every map maker and every map reader sees a map differently because each brings a unique mind set to the image based on the personal fund of experiences from which a pattern of meaning is drawn. Thus even virtually identical maps produced from a computer program by two different individuals will have different meanings to their makers as well as their readers. When historians look at maps as documents they need to take seriously two principles advocated eloquently by the late J. Brian Harley. First, every map is a theoretical model of spatial phenomena. Secondly, it is the historian's task to tease out meanings not always apparent on the surface. In other words, start with denotations, then consider connotations.

Cartographic Traditions in the History of Western Civilization was a five-week summer institute funded by the National Endowment of the Humanities to help teachers wrestle with maps in accord with Harley's two principles. The effort built on an earlier project to construct a series of one hundred transparencies that reproduced source maps for Western civilization from 8000 B.C. to the present. *Discovering Western Civilization through Maps and Views* (New York: HarperCollins, 1991) attracted a great deal of interest in large measure because of the growing consensus that geography must become an important part of history instruction in our nation's classrooms. For this effort to really be successful, cartographic literacy must be considered more than the ability to find places on a map. It must also place every map in the context of temporal, social, and cultural space as well. Students must have the ability to come to any map prepared to strike up a conversation about its nature, its purpose, and its rhetorical structure. Then, the map can step out of its inert function as a scientifically drawn reference tool and reveal itself as a contrived argument about the nature and character of spatial arrangements. Cartographic dry bones will spring to life.

It is premature to say that any particular selection of old maps or an emphasis on these documents as primary sources has furnished exemplary pedagogical tools or enduring curriculum materials. What we can offer with a bit more confidence is an agenda for discussion.

The agenda presented in Figure 1A focused a discussion by the teachers' advisory committee for the Cartographic Traditions grant. The first question, for example, on definition, was addressed concisely by David Buisseret, an academic consultant to the group. "A map is a representation of a place." More discussion followed in response to a suggestion to add the phrase "real or imaginary" to the end of the definition. Some scholars also emphasize the design qualities of maps or their function as cognitive systems. Dana Durand, for example, defined a map as "a work of art, possessing a style, a composite of form and content reflecting the total aspect of the culture which gave it birth." Brian Harley pushed even further, urging historians to see the way "maps act as visual metaphors for the values enshrined in the places they represent." In a functional definition, maps are various devices that suggest what the earth is like; they help readers grasp spatial phenomena without seeing places in person.

Defining maps as representations of places admits a wide variety of other devices that might be excluded under a more rigid definition of maps. Aerial photographs, remote sensing images, cartograms, bird's-eye views, cross sections, diagrams, and even landscape paintings were all welcomed into the cartographic fold by our working definition of maps as representations of places. By utilizing a variety of representations of a place, students would not only have a richer grasp of its geography but could more easily recognize the strengths and limitations of each presentation. Moreover, the intellectual resolution of differences found in various sources or models is central to the historian's craft.

The second question on how to read a map as a historical source led to several specific suggestions. First, be sure that you know what you are looking at when viewing a map. Locate it in a larger setting. Check its title, legend, and symbolic system. Then, look at the map as a synthesis, an attempt to create a cohesive entity out of bits of data. This map is the way people of another time envisioned a place. Therefore read it not only in the context of modern knowledge but seek out its otherness, the shifts, often quite subtle, from the way we would picture this place to that implicit in the map's format. If the map presents puzzling aspects, start with what is familiar, then attempt to state why the map was made. What was the author's primary intention? Try to animate the map by searching for its dynamic qualities. What does this map make possible? View it as a "menu of meanings."

A final consideration is to note the differences in approach of large and small scale maps. The latter, like world or continental maps, attempt to clarify overall patterns in a general way. Large scale maps, in contrast, focusing on a smaller region, are often loaded with lots of specific details to evoke the extra dimension of immediacy.

The discussion of the third question—what contexts are useful studying old maps—featured several examples of how the social and economic milieu out of which the documents emerged influenced their form and character. John Smith's map of New England (Figure 1B) for example, with the large relative size of the English ship and the reduced evidence of the Native American landscape, could be viewed as an icon of power. Its wealth of information and wonderful immediacy could be rooted in its composition, publication, and audience. The map was certainly not a discrete object floating free of bias affording a transparent window to Virginia in the early seventeenth century.

Maps are culture-forming documents. The history of cartography therefore needs to go beyond the positivist theme of cumulative advances in knowledge ending in the scientific and presumed value-free cartographic information systems of the 1990s. Different types of maps lend themselves to different interpretive strategies. Professor Durand, for example, suggested three broad avenues of approach: the teleological, the practical, and the scientific. The first would consider the map as the "temporal setting of an eternal drama." The second would place the document in the locus of practical activities such as way finding or recording boundaries. The third method would measure the maps as disinterested representations of spatial phenomena.

After prolonged discussion, five components of cartographic literacy were agreed upon in addressing the fourth item on the agenda. The first, simple map reading, centered on the ability to decode cartographic messages in their denotation aspects. The second, interpretation, brought connotation considerations to the forefront. Critical analysis and appraisal, the third category, seemed to set up a dynamic interchange between the first two. This conversation, the group agreed, would be greatly advanced by a fourth aspect of cartographic literacy: the ability to draw maps. The process of drawing a map quickly reveals how much selection is involved in cartographic design. The fifth element of cartographic literacy centered on the use of a map as a springboard to further thought and action. How might a map empower its reader? What suggestions did it make for further reflection? Did it serve purposes of synthesis as well as analysis?

The discussions provoked by questions five, six, and seven centered on instructional techniques. Several teachers emphasized the importance of students designing their own maps to help them take seriously the point of view of any cartographer. Some contact with original old maps as well as introductory experiences in drawing new maps and an awareness of the various ways maps have been mechanically reproduced would give students a deeper appreciation for maps.

Question eight asking about the special qualities of maps set a recurring theme for the Cartographic Traditions project. As long as any particular representation dealt with space or place, the group was reluctant to exclude it from the cartographic fold. An elastic definition seemed to be a key to the special power of maps as visual images and instructional tools. Arthur Robinson's dictum set the whole effort in a positive light. "Maps have been termed the oldest of the graphic arts," he wrote, "and as a means of communication about man's living space they have no peer."

Throughout the five-week summer institute speakers took different roads when exploring the special qualities of maps. One suggested that maps were usually optimistic, offering geographies of hope. Another noted how maps disclosed hidden meanings, revealing patterns, connections, and significant elements that were not apparent when observing a place in person. Old maps captured the flavor of the past, picturing the inner life of former eras. New maps, if more difficult to view as cultural artifacts, offered a world of possibilities to the serious reader, providing many opportunities for personal discoveries. After looking at maps for five weeks the participants in the summer institute were convinced that maps were too important to be studied only by geographers.

The ninth question on the geographic basis of cartographic literacy served as a warning that history teachers needed to include a lot of geography in their classes. Map interpretation depends on prior knowledge. A background in geography gives a map reader a knowledge of the "normal habitats" of cultural and physical features, providing hints of where to look for certain things on a map and how to weave a pattern of cartographic understanding. As one teacher noted: "to encounter an unfamiliar map is the same as visiting a country with an unfamiliar culture."

Any map's usefulness is confined by the reader's prior knowledge, which suggests a way to answer the tenth question concerning the limitations of maps. They are subject to the shortcomings of any system of communication—knowledge, data, ideas, symbols and designs all exist prior to the graphic representation. Mark Monmanier's recent book, *How to Lie with Maps*, provides ample documentation on a variety of devious procedures used by the sending agent, but the other end of the communication process is equally hazardous. The more a reader brings to a map, the more he or she will see in it and the further he or she will see through it.

Brian Harley once made the comment that no map could answer all the questions that it raised. That limitation, of course, is also an advantage. History's essence is more inquiry than resolution. Maps can suggest fresh questions that deepen insight and elaborate understanding. They can be bold and stark as images, often appearing as ordinary artifacts. Their simplicity, however, may be only on the surface, simplifying a complex environment and covering many layers of meaning.

Maps can thus serve as a fitting metaphor for the historical process—mapping the past is what history courses are all about. To leave cartography out of the range of documentary evidence used by historians seems most inappropriate. To neglect an analysis of maps as primary sources is to let them float free of a historical context and to neglect a major element of cartographic understanding. Putting maps into the context of time and using maps to bring meaning to the past are two essential functions in the teaching of history. Both help us see more clearly and, as Jonathan Swift observed long ago, "Vision is the art of seeing things invisible."

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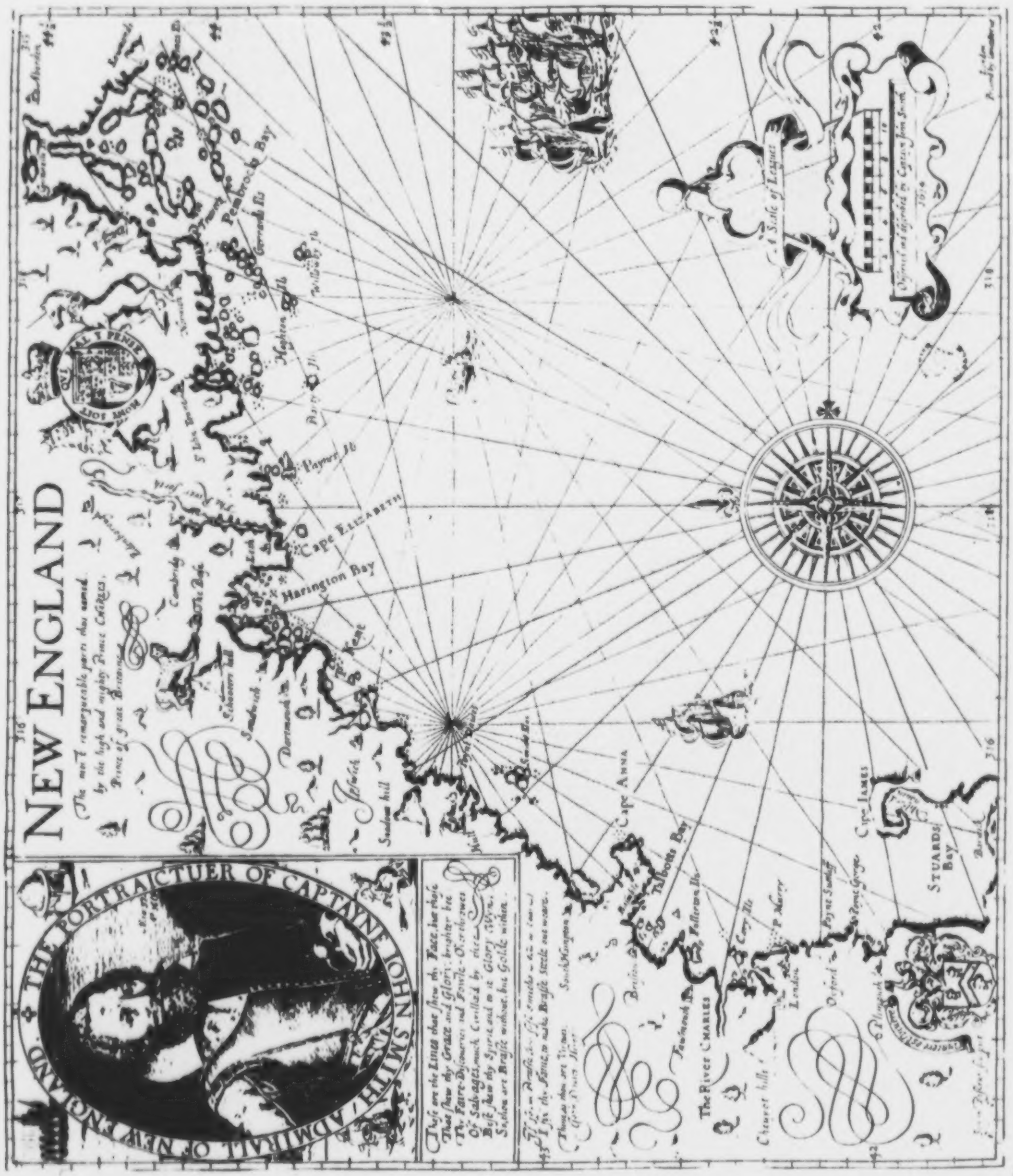
Figure 1A

Maps in the Context of Time: Some Questions for Orientation and Discussion

1. What are maps? What related items might profitably be included in a study of old maps?
2. How does one go about reading and interpreting a map, especially one that presents unfamiliar data or originates in another era or culture?
3. What contexts are most helpful for studying old maps? How can we connect maps to general historical developments or use them to illuminate broader elements of culture?
4. List some elements of cartographic literacy. In what ways might the history of cartography help teachers develop the cartographic literacy of their students?
5. Discuss the potential advantages of students viewing original documents as compared to facsimiles or redrawings of historical maps.
6. How might a person's own experience in drawing a map promote an understanding of maps and their nature as historical sources?
7. How does knowledge of the way in which a map was printed or reproduced help one understand its value as a historical document?
8. What is special about maps? How do they differ from other forms of scientific geographical, or artistic expression?
9. What is the relationship between geographical knowledge and cartographic literacy? Does understanding usually start with the former or the latter?
10. What are the limitations of maps? How might they mislead readers? Do all maps present a distorted image? How can readers best be on their guard when evaluating maps?

John Smith Map of New England, 1616

Figure 1B


NEW ENGLAND
The most remarqueable parts thus named by the high and mighty Prince Charles, Prince of great Britaine
THE PORTRAICTUER OF CAPTAYNE JOHN SMITH ADMIRALL OF NEW ENGLAND
These are the Lines that shew thy Face; but those That shew thy Grace and Glory, brighter bee: Thy Faire-Discoueries and Fowle-Overthrowes Of Salvages, much Civillized by thee Best shew thy Spirit; and to it Glory Wyn; So, thou art Brasse without, but Golde within.
Pembrock Bay
Cape Elizabeth
Harington Bay
Cape Anna
Talbotts Bay
The River Charles
Cape James
Stuards Bay
A Scale of Leagues

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Chapter Two

The Center of the Earth: World Maps and Point of View Analysis

Mark Newman

A teacher from Lindblom High School approached me at the end of a workshop on maps offered as part of the 1993 annual Chicago Public Schools Social Studies Conference. Apparently the session had jarred his cartographic sensibilities. With some emotion he told how, upon first seeing the various maps presented, he had instinctively thought, "No, that's not how the world looks. That's not how we were taught." But, upon reflection, he realized that, in fact, the world did look different when centered on various meridians, and the fact that Islamic maps were oriented with south at the top did not make them "wrong." All this made him question how he had been taught to look at maps, and how he had used them in the classroom. It was obvious that the workshop had given this high school history teacher new insight into maps, while raising basic questions regarding his own study and teaching of history.

The response of this high school teacher was more pronounced than most, but not atypical. At virtually every workshop we have offered—and certainly this was true in the 1992 NEH-sponsored Summer Institute on Cartographic Traditions in the History of Western Civilization— learning that maps are malleable, multidimensional, and, as J. H. Parry put it, "slippery witnesses" has struck a nerve among the participants.[1]

As these examples show, gaining an expanded sense of maps is not difficult. After all, they are familiar fixtures in our lives. But our orientation towards them is usually so narrow that we tend to miss more than we see. To paraphrase an old television program opening, there are eight million stories in maps, but usually only one is recognized because our map literacy is limited. The first step in learning how to read the many tales maps can tell is realizing that they are related to a moment in time. They are not scientifically based, timeless expressions. Rather, maps are images, or as historian David Buisserret put it, "representations" of places that may or may not be drawn scientifically. True, the notion of science in cartography is a recurring refrain, but it is not the only one, and in the context of history, hardly the dominant theme. The points of view espoused and the many messages communicated in cartography often have nothing to do with accuracy of representation. And the notion that maps are only geographic representations of places should also be discarded.

One way to grasp the multidimensional character of maps is to approach them from different points of view. For example, the goal here is to examine a number of world maps from the Western civilization tradition over a long period of time. While the analysis of such a small sampling is neither definitive nor comprehensive, it does provide insight into some vexing historical issues currently being debated regarding centrism and Western civilization. However, it should be remembered that this is just one story sketchily told and used primarily for demonstration purposes. It is not an attempt to settle an ongoing discussion. The purpose, rather, is to expand our vision of maps, to raise questions about maps and their uses, and to explore expanded bounds of map literacy.

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[1] Cited in David Buisseret (ed.), *From Sea Charts to Satellite Images: Interpreting North American History Through Maps* (The University of Chicago Press, 1990).

The notion of centrism and the Eurocentric world is an ongoing educational controversy that dates back several decades. Its roots are partially found in the general education movement of the late forties and fifties, and the inability to open up the curriculum to non-Western cultures in a way that provided an overarching synthesis. There has been concern over the teaching of European superiority as "fact" and the inability to define Western civilization as something beyond the European experience. There is an image of a monolithic entity called Europe—and later the United States—stamping out all in its path in the name of racial and cultural superiority, which in part reflects actual aspects of international relations over the last several centuries.

As the debate continues, progress has been made in illuminating the sources of the controversy. There is growing recognition that this Eurocentric hegemony is of recent vintage, dating back to the European voyages of exploration to Africa, Asia, and America. It is also possible that centrism was used primarily to justify imperialism. An examination of selected maps produced before the age of discovery indicates that the notion of centrism was hardly a European invention, and that the "Europe in the center of the world" orientation that came to dominate European cartography after 1500 was much less a force before that time. The focus here will be on a series of maps that span the time period from approximately 500 B.C. to 1275 A.D. All were products of evolving Western civilization, and their examination offers great insight into the notion of centrism and this misunderstood label—Western civilization—which has gained such a negative connotation in recent years.[2]

The Babylonian world map (Figure 2A) dates back to approximately 500 B.C., though many scholars think it represents an older tradition. It is the oldest extant world map yet discovered. Produced on a cuneiform tablet, the map was apparently part of a series of tablets that comprised an ancient school textbook of sorts. Thus, it indicates how long maps have been used as educational aids. It has survived only in fragmentary form and so definitive, consensual scholarly analysis is impossible. Because of the schoolbook format, we can suggest that the map represented a traditional, widely accepted view. Cartographically, it may be a pioneer of the T-O form that characterized many Western maps in medieval times. The "O" is seen in the bitter river surrounding the earthly world, while the "T" is evident in the way the rivers are depicted on the map.

The context of the map itself illuminates aspects of Babylonian society. Its suggested use as a school text offers evidence of a formal education system. Equally important, the map extends its image beyond the earthly world to the cosmos. The world is not defined just by the earth, but by the heavens, too. The earthly world is surrounded by the bitter river, which is shown connecting to the salt water Persian Gulf, labeled as bitter. Beyond this are a number of islands—how many is in dispute but seven are shown in this reconstruction—which served as connecting places to the heavens, the starry night skies where the gods lived. The orientation of the map is to the northwest.

By examining the center, it is readily seen that this map was less concerned with geography than with instilling basic values among its users. Students learning about Babylonian cosmology were given a heavy dose of citizenship training in the process. The primary message imparted was that Babylon was the center of the world, both earthly and heavenly. Various cities and areas are identified around it, but there is no doubt, this map is Babylon centric. Thus, even in the earliest days of cartography, the makers of maps recognized the propagandistic value of these images. There is no better way to engrain notions of superiority, both political and religious, than by placing yourself in the middle of the world—and the cosmos. In Babylon, showing cultural and political superiority was apparently important, and it was connected to the need to provide students with a graphic conception of the world and universe in which they lived.

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[2] The maps used as examples here all appear in Gerald A. Danzer and David Buisseret, *Discovering Western Civilization Through Maps and Views* (New York: HarperCollins, 1991).

Regarding Western civilization, this map is part of the tradition that traces major roots of our world to Mesopotamia, so the first center of Western civilization can be plotted in present-day Iraq. Cartographic evidence for this connection will become apparent in the examination of a later map that used a similar T-O format and likewise extended the bounds of the world beyond the earthly domain to the cosmos.

While the Mesopotamian cartographic tradition exerted a strong influence on later Western maps, it was not the only school of thought. The next example comes from Classical Greece and presents an equally important and influential cartographic tradition—the view of the world according to the early Greek historian Herodotus, dating back to circa 450 B.C. (Figure 2B). Herodotus did not draw any maps, but rather described the world in words so the image here is a modern reconstruction. Reflecting Greek secular humanism, which based interpretations of the world on observation and rational thought leading to deductions, Herodotus' view of the world drew upon his extensive travels in Europe, Asia, and North Africa. The resulting map had no religious connotation, but instead was restricted to the ecumene, or the inhabited part of the world; much of which Herodotus had visited. Only what was known appeared on this map.

In many respects, Herodotus's map represents an opposing response to the Mesopotamian cartographic tradition. It rejects the T-O form, does not extend beyond the earthly world, seems more concerned with accuracy of location than the Babylonian map, and, despite an obvious shift to the Mediterranean, the pronounced centrism of the Babylonian map is missing. Political connotation also seems to be missing—Greece is not excessively highlighted. The bias here is toward the known world of Western civilization, which at the time of Herodotus included the Mediterranean littoral of Europe, Asia Minor, Mesopotamia, and North Africa, as well as Persia and India. It is interesting that Europe, in large part, exists beyond the ecumene, and most of the continent is labeled "unexplored." The island of Britain is not even shown. Thus, in the development of Western Civilization, we can see a subtle shift from Mesopotamia to the Mediterranean, though the larger context of the ecumene is also apparent.

The culmination of Greek culture came with the rise of Hellenistic culture. Though based on the Greek tradition, it included influences from North Africa, Mesopotamia, Persia, and India. In cartography, the Hellenistic view of the world reached its own definitive form with the *Cosmographia* of Ptolemy, which presented perhaps the most comprehensive representation of the ecumene up to that time. If Herodotus presented an early, sketchy view of the world, Ptolemy's image was incredibly comprehensive and detailed, though not necessarily accurate. Claudius Ptolemy lived in Alexandria, Egypt in the second century of the common era. The city was a major center of Hellenistic thought and had a massive library. The writings of Ptolemy not only summed up Hellenistic learning, particularly in science, but served as a major source of this thought for later generations. It was the preservation and use of Ptolemy's works by the Byzantines and later the Muslims that, in part, allowed European scholars to become aware of the Hellenistic accomplishments during the Renaissance.

The world map shown here (Figure 2C) was reproduced in a German edition printed in the 1480s. Following the tradition of Herodotus, Ptolemy's map extended the scientific method of cartography to a much more advanced level. He designed a grid of meridians and parallels to help scientifically locate places. Ptolemy relied on astronomical observations to determine the latitude of a location. His determinations were recorded in a list of places along with their coordinates. By placing each site on the grid, the world map could be drawn.

While this map offers a number of points of view to explore, our focus remains the center. The very use of a mathematically determined grid reduces, but does not eliminate, the political or cultural bias of a map. Incomplete knowledge of the world has resulted in many inaccuracies, such as the belief India was an island and the continuation of Africa around the globe making the Indian Ocean a landlocked sea. The Mediterranean is also much larger on the map than in reality. Given the Ptolemaic stress on reason, these flaws can partly be explained by the limitations of the science available to Ptolemy. After all, even today with satellites and computers, reproducing an accurate image of the world is difficult. But, there is still that notion of the center of the world.

Ptolemy's center is Mesopotamia. In part, this reflects the use of coordinates, but it also shows that the very design of the grid and the determining of the longitude and latitude biased the center of the map. In dividing the world, Ptolemy plotted longitude along a semicircle of 180 degrees. The distortion occurring in the size of the world horizontally, particularly the exaggerated Mediterranean, moved the center closer to Ptolemy's realm rather than placing it farther east. For example, if we were to take a modern projection of the Eurasian-African land mass, its center is approximately at the border between China and India, near Nepal. These lands were known to the people of Ptolemy's time, given centuries of trade connections. Yet, Ptolemy's projection keeps the focus on West Asia and the Mediterranean. Note that the cartographic center of Western civilization remained far removed from Europe, even at the height of the Roman Empire. Scientific plotting had much to do with this; there was no need to recognize the supremacy of the Roman conquerors by placing them at the center of the world. All roads may have led to Rome, but the world did not have to be shown revolving around the city.

The next example is a Muslim world map from 1154 A.D. (Figure 2D). Born in Moorish Spain and educated at Cordoba, Ash-Sharif al-Idrisi traveled throughout much of the Western world. His writings became very well known. In 1138, Norman King Roger II of Sicily hired al-Idrisi to head a new geographical institute. Drawing upon the Ptolemiac tradition, Idrisi and his scholarly colleagues compiled a vast library of geographical knowledge that included sea charts, travel itineraries and accounts, and other sources. In 1154, al-Idrisi reported to Roger on his findings in a work called *The Delight of One Who Wishes to Transverse the Regions of the World*. The compendium, which appeared in both full and abbreviated versions, included a map of the world and 70 regional maps. It is the world map that draws our attention.

Though commissioned by a Christian, the al-Idrisi map of the world fits well within the Muslim cartographic tradition. It does not divide the planet into continents, but presents a single land mass connected, not surprisingly, at the junction of Egypt and Arabia. In addition, the orientation has the south to the top and west to the right, which was typical of Arabic maps.

The center of the map indicates its focus and centric bias. Arabia is placed in the middle of the world, with the single land mass radiating out from it. One of the strongest cartographic influences on this version of the earth was clearly the Ptolemiac tradition. The map seeks scientific accuracy by dividing the world into seven regions based upon *climas* that are used to depict latitude. There are also 10 longitudinal zones. The land mass, particularly Africa, follows Ptolemy's version in that it extends eastward. Yet, the placing of Arabia at the center shows that religion, not science, provided the context for this spatial representation.

The primary concern of al-Idrisi might have been to show the supremacy of Arabic culture, and more importantly, depict Islam as the only true religion. Thus, this map, though it has scientific pretensions in its plotting and mathematical divisions of the world is really an Arabic-Islamic centric view of the world. Just as the faithful must face Mecca in their daily prayers, so the ecumene also revolves around the birthplace of Islam. By orienting the map with south at the top, Arabia rests securely above Christendom, a not very subtle juxtaposition during the age of the crusades.

The Islamic context of the map also has bearing on the history of Western civilization. The heavy influences of the Hellenistic cartographic tradition show that Islam at this time was not an alien culture, but rather fit firmly within Western tradition. In fact, it could be argued that at the time the locus of Western civilization rested firmly in Islam, as Moslem centers were playing major roles in recovering and preserving the Classical Greek and Roman heritage. In its origins, too, Islam had drawn heavily upon Judaism and Christianity, making it an integral part of the religious traditions of Western civilization. The religious connotation also reinforces the primary role faith played in each society at this time.

Many of the above points are reinforced by the last map to be studied. Constructed on a huge, single skin of vellum measuring 54 x 64 inches, the Hereford map (Figure 2E) was constructed circa 1275 A.D. Vellum was made from the skin of an ox. Where the al-Idrisi map followed the Ptolemaic tradition, Richard of Haldingham and Lafford, who made this map, followed the older T-O school of cartography. There are no apparent scientific pretensions to this map. It includes the ecumene, but also extends beyond the earthly world. There is also a major error in that Europe and Asia are mislabeled on the map.

The map is Christian-centric and has a pronounced religious context. The world revolves around the holy city of Jerusalem. The map is oriented towards the east, which enhances this religious context. In this age of faith and temptation, Richard's depiction of the world can be seen as a road map to salvation. To the west, the world stands on the pillars of Hercules, its pagan origins so to speak. In another sense, the pillars of Hercules, really the straits of Gibraltar, indicate the known maritime world of the Europeans. The Atlantic was largely an unknown sea (except to the Vikings). The dominance of the Mediterranean is also evident as it forms the base of the "T." Heading east, Jerusalem is at the center of the world, a crown-like symbol indicating the holy city. The temptation of sin stands between Jerusalem and paradise, which exists at the top of the map, ironically somewhere east of India. The city of Babylon and its Tower of Babel, celebrated in scripture to show the corruption and ego of humanity, stand in the way of those seeking the promise of Heaven. Thus, the earthly tension between faith and sin, between the human ego and the giving of oneself to Christianity are cartographically represented on this map.

As was true for the al-Idrisi map, religious centrism is even more evident in the Hereford version of the world. The world is defined by religion and the growing split in Western civilization is based upon conflicting faiths, each intimately connected to the other, but each following different roads to salvation. The use of the term Christendom to identify Europe reinforces the religious delineation of the Western world. The European, Christian tradition is coalescing, while the Islamic tradition is diverging. The synthesis needed for a unified conception of the West seems to be coming apart. Cartographically, however, the locus has not yet shifted north and west into the European heartland. The world remains centered around the West Asian-Mediterranean axis. A Eurocentric conception is at best embryonic and not yet geographically or ethnically defined. It also may relate more to promoting faith within an in-group rather than showing superiority, as the tension between Babylon and Jerusalem indicates.

The implication of this study is that centrism seems to be a universal cultural trait. Sometimes, it is used to show superiority. At other times, the knowledge base is a critical factor. In still other cases, it appears to reflect basic needs of a society. These maps also suggest the evolving nature of Western civilization within a multicultural context that extends far beyond Europe. The current arguments over centrism and Western civilization gain added dimensions when approached through a cartographic analysis. However, to grasp this point requires looking at the maps from a different point of view, namely the perceived center of the world on each one. Other aspects and other insights can be gained from using other points of departure for a discussion.

Just as maps exist in several dimensions, so our ways of examining them also are multifacted. What we see and what we learn depends largely on what particular facet is used, and this changes with our point of view.

A Babylonian View of the World, c. 500 B.C. **Figure 2A**

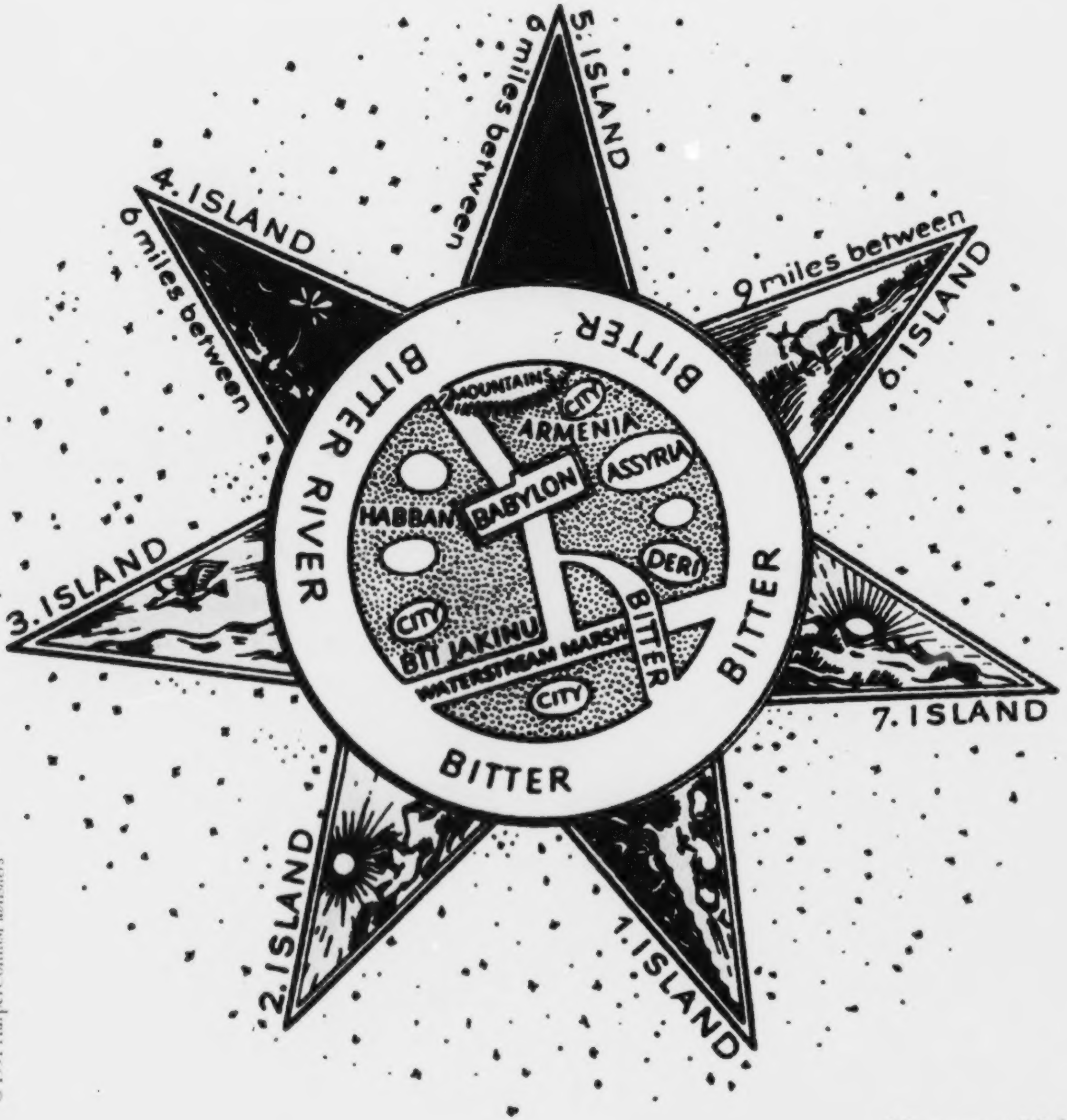
5. ISLAND
6 miles between
4. ISLAND
6 miles between
9 miles between
6. ISLAND
3. ISLAND
7. ISLAND
2. ISLAND
1. ISLAND
BITTER RIVER
BITTER
BITTER
BITTER
MOUNTAINS
CITY
ARMENIA
ASSYRIA
BABYLON
HABBAN
DERI
CITY
BIT JAKINU
BITTER
WATERSTREAM MARSH
CITY

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Figure 2B

Herodotus: A Reconstruction of His World View, c. 450 B.C.

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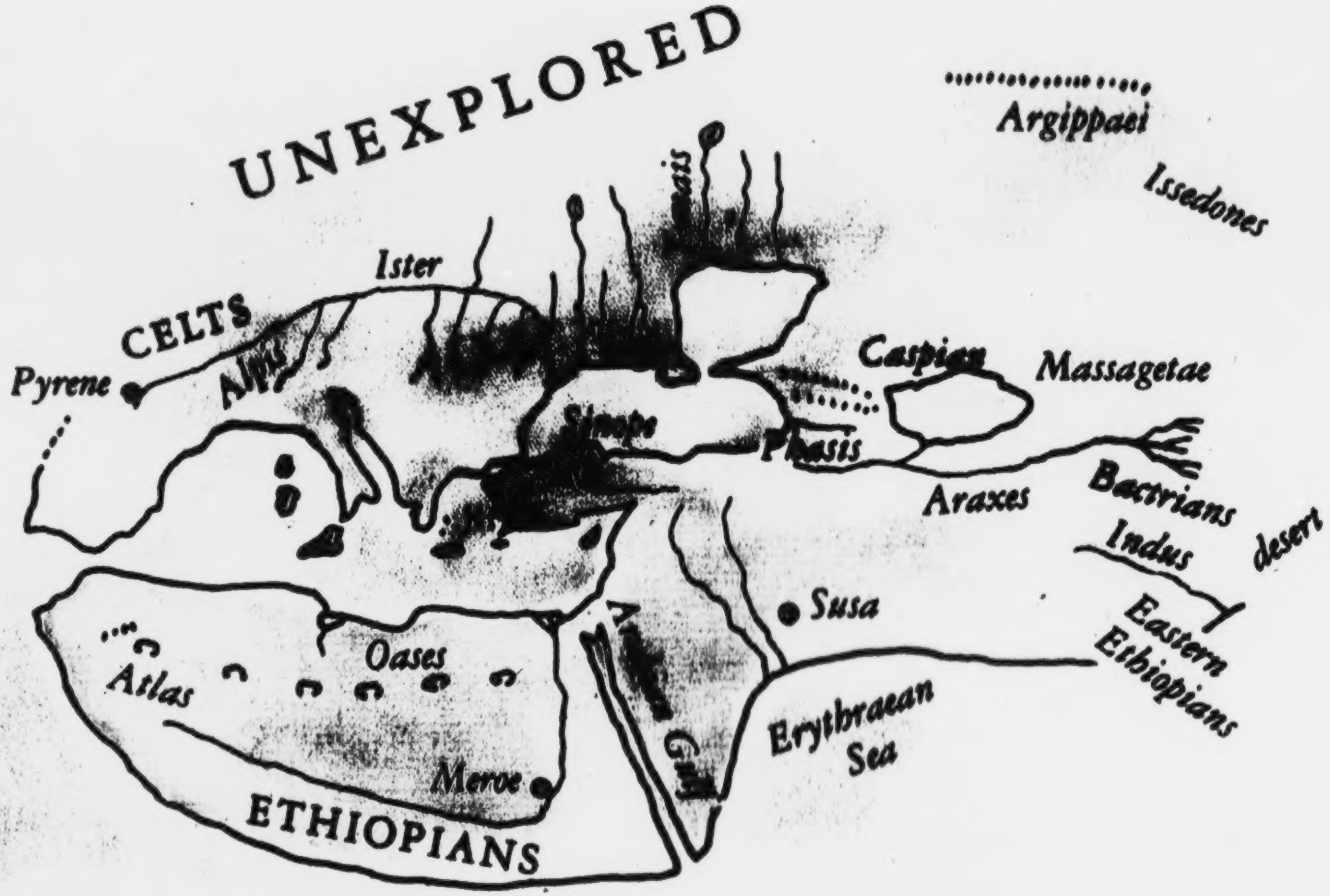
UNEXPLORED
Argippaei
Issedones
Ister
CELTS
Pyrene
Alps
Sinope
Caspian
Massagetae
Phasis
Araxes
Bactrians
Indus
desert
Susa
Eastern Ethiopians
Erythraean Sea
Arabian Gulf
Oases
Atlas
Meroe
ETHIOPIANS

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Ptolemy: World Map of the Second Century A.D.

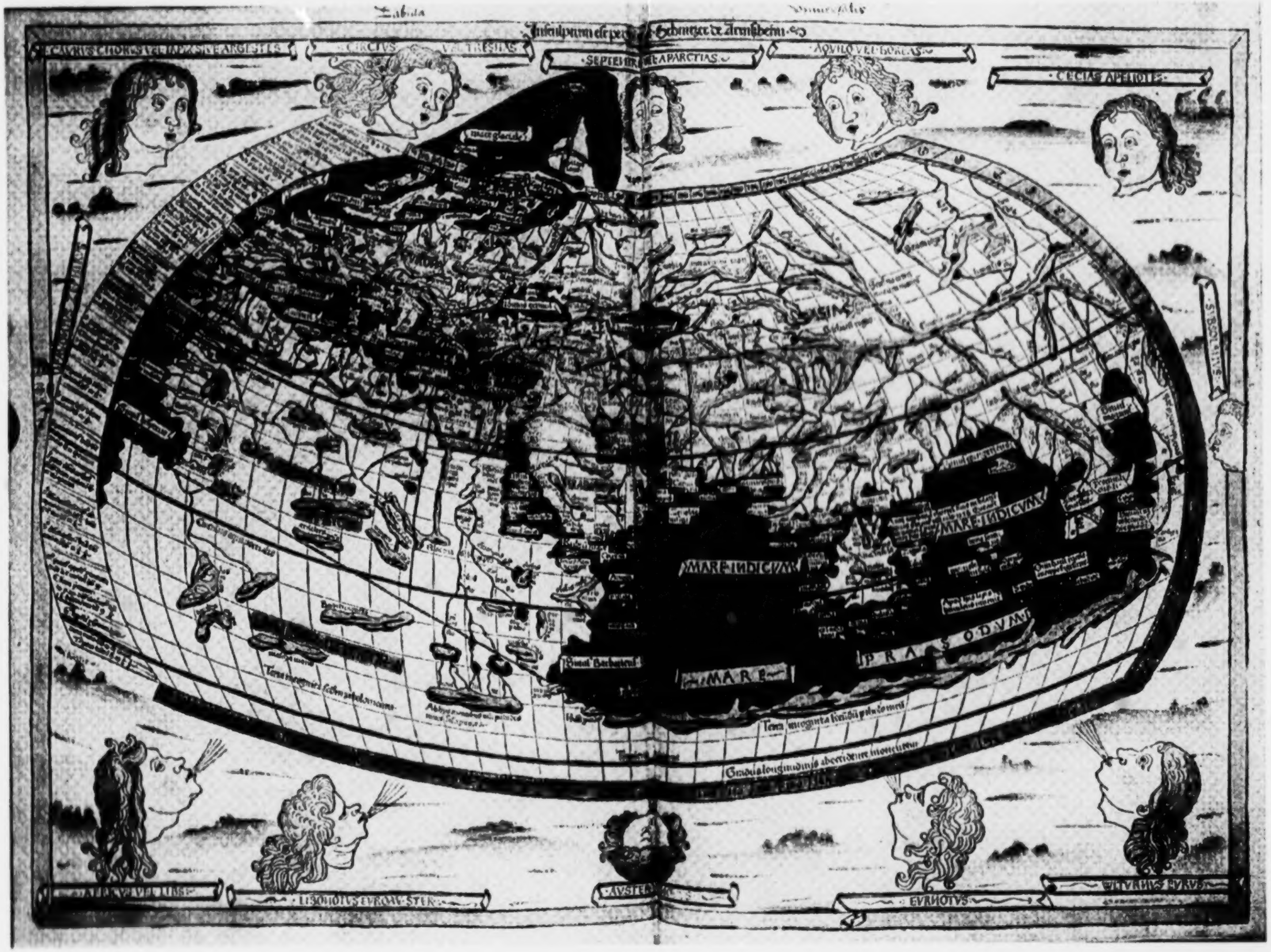
SEPTENTRIO APARCTIAS
AQUILO VEL BOREAS
CECIAS APELIOTES
SUBSOLANUS
MARE INDICUM
MARE INDICUM
PRASODUM
MARE
AUSTER
EURNOTUS
VULTURNUS EURUS
AFFRICUS VEL LIBS
LIBONOTUS EURO AUSTER

Figure 2C

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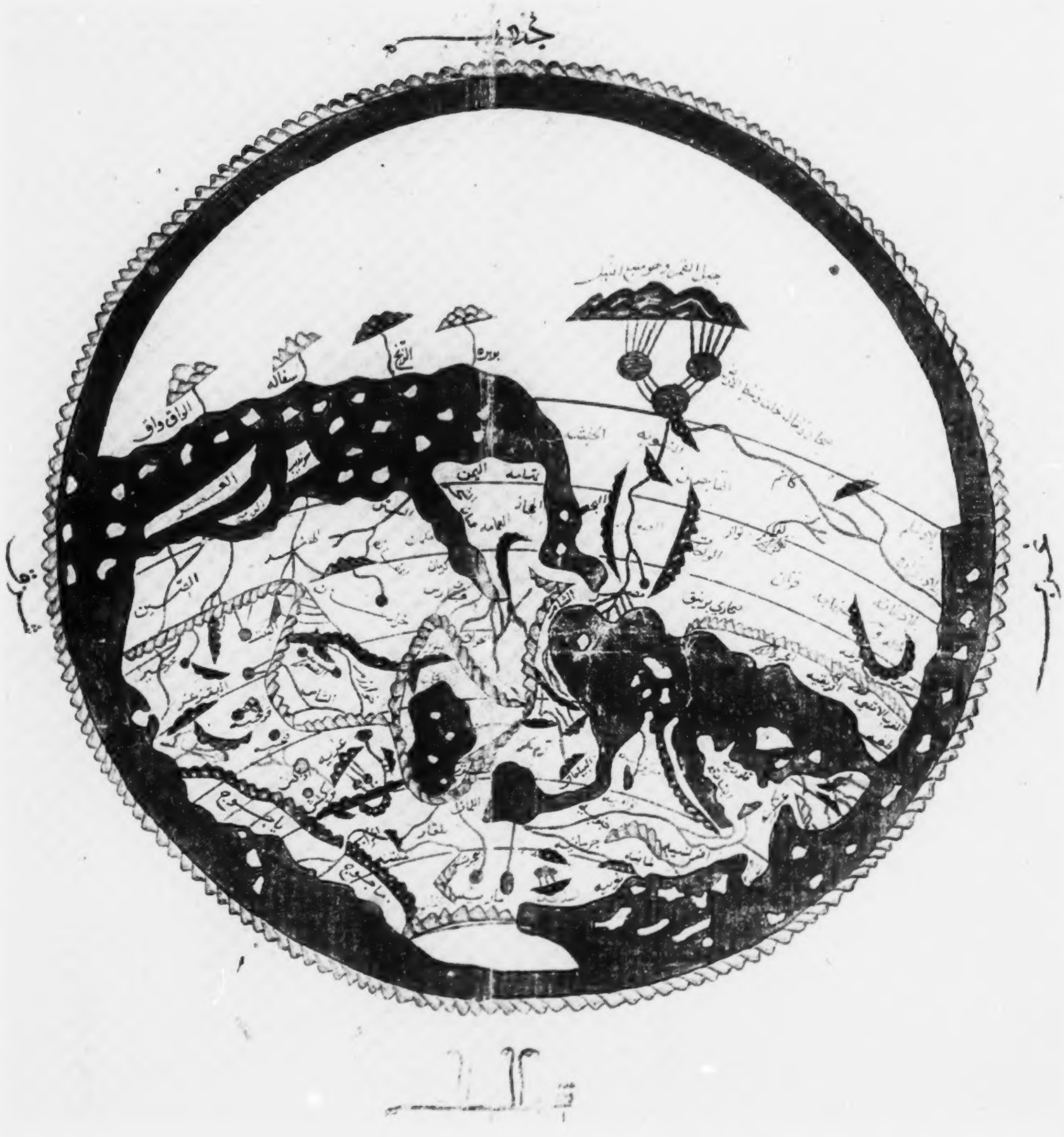
Figure 2D Al-Idrisi: Map of the World, 1154 A.D.



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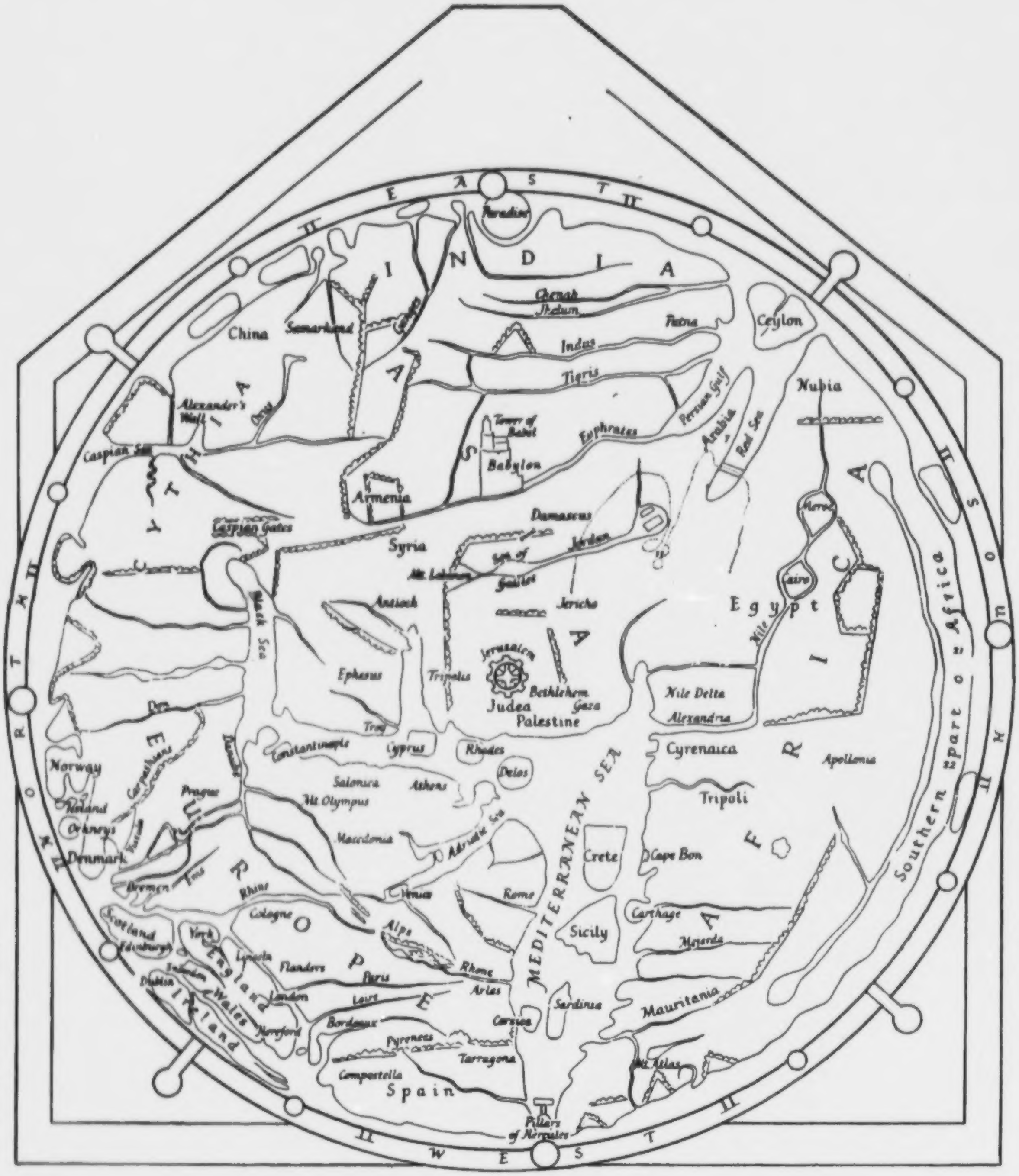
A Key to the Hereford Map, c. 1275 A.D.

Figure 2B


EAST
Paradise
INDIA
China
Samarkand
Ganges
Chenab
Jhelum
Indus
Patna
Ceylon
Tigris
Alexander's Wall
Oxus
Tower of Babel
Babylon
Euphrates
Persian Gulf
Arabia
Red Sea
Nubia
Caspian Sea
SCYTHIA
Armenia
Caspian Gates
Damascus
Syria
Jordan
Sea of Galilee
Mt. Lebanon
Antioch
Jericho
Meroe
Cairo
Egypt
Nile
Black Sea
Ephesus
Tripolis
Jerusalem
Bethlehem
Judea
Gaza
Palestine
Nile Delta
Alexandria
Don
Troy
Constantinople
Cyprus
Rhodes
Delos
Cyrenaica
Apollonia
Norway
Carpathians
Danube
Prague
Salonica
Athens
Mt. Olympus
Iceland
Orkneys
Vistula
Denmark
Macedonia
Adriatic Sea
Crete
Cape Bon
Tripoli
Bremen
Elbe
Rhine
Venice
Rome
EUROPE
AFRICA
MEDITERRANEAN SEA
Cologne
Alps
Scotland
Edinburgh
York
England
Lincoln
Flanders
Paris
Rhone
Sicily
Carthage
Mejerda
Snowdon
Dublin
Ireland
Wales
London
Loire
Arles
Sardinia
Mauritania
Bordeaux
Hereford
Corsica
Pyrenees
Tarragona
Compostella
Spain
Mt. Atlas
Pillars of Hercules
NORTH
WEST
SOUTH
Southern part of Africa

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Chapter Three

Islamic Maps in the Context of Western Civilization

Kathleen Borghoff

Maps represent not only beauty and locations; they also trace history, illustrate culture, and describe the world in which the cartographer lived. Without antiquarian maps, we would possess an incomplete picture of how various societies viewed other cultures. By studying both European and Islamic maps between 600 and 1500 A.D., a new appreciation of the Christian-Muslim relationship develops. The symbiotic, yet individualistic, association of these two cultures described in books comes to life through their maps. But with the rise of the Abbasid dynasty in the ninth century, Baghdad became the most important center to carry on Hellenistic scientific traditions. This Islamic superiority lasted until the Crusades, when Islamic cartographic traditions ebbed and a Christian/European cartographic tradition reemerged. Without the Islamic maps, the rebirth of European cartography would undoubtedly have been delayed.

A full appreciation of this phenomenon requires some background. Before 622 A.D., two popular monotheistic religions existed in Europe, Asia, and Africa: Christianity and Judaism. With Mohammed's revelations and the creation of the Koran-an, the picture drastically changed. Suddenly Islam swept across the known world, enveloping Egypt, Northern Africa, Spain, and France. This rapid advance through Europe was thwarted in 732 A.D. by Charles Martel at the Battle of Tours. Undaunted, the Muslims continued eastward into southwest Asia and parts of India. Soon Muslim travelers had explored much of Europe, Asia, and North Africa.

Muslim treatment of non-Muslims in these newly conquered territories is also noteworthy. Since many welcomed the Muslims as an improvement over the corrupt and dying Byzantine Empire, non-Muslims were left relatively undisturbed. Typically, Muslims began their integration process by living in camps outside major towns and trading produce and riches with the populace to begin an alliance between conqueror and conquered. This put warriors in a position to marry the local women, converting them to the Muslim faith in the process. Often Muslims purchased land from the conquered as a show of good faith. Monotheistic peoples were still allowed to practice their religion freely—a tax upon their goods was their only punishment. Polytheistic believers, conversely, were forced to convert or leave.[1]

Also noteworthy of the Muslims was their desire to acquire knowledge. In *Genius of Arab Civilisation*, Phillip K. Hitti describes the Muslims: "(they) sat as pupils at the feet of the people they subdued—and what inquisitive pupils they proved to be."[2] They absorbed classical literature, Hellenistic thought, Byzantine political institutions, Roman law, and Greek science. Their emphasis on learning was so great that in 830 A.D. caliph al-Ma'mum founded the House of Wisdom in Baghdad.

But even before the creation of the House of Wisdom, the Muslims were unearthing classical knowledge. The Greek works of Ptolemy were being translated by the Islamic intellectual elite. Caliph al-Mansur, grandfather of al-Ma-mum, and his colleague Harun al-Rashid requested maps be drawn for them. Although none of these military maps have been recovered, there are references to them in literary translations.[3] Prior to finding the maps of Ptolemy there was probably little Muslim interest in maps and map making. The Arabic language has no indigenous word for map; surah, meaning a picture or representation, was used instead. After the Muslims encountered Ptolemy, their interest in maps clearly grew.

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[1] Seyyed Hossein Nasr, *Islamic Life and Thought* (Albany, NY: State University of New York Press, 1981), p. 26.

[2] John R. Hayes, ed., *The Genius of Arab Civilization: Source of Renaissance* (Cambridge: The MIT Press, 1983), p. 9.

In the late eighth and early ninth centuries, the Muslims created astrolabes and determined through the stars where places were in relation to each other on earth. Much like Ptolemy and his counterparts, lists and charts were created giving the longitude and latitude of numerous places. Perhaps the most accurate and all encompassing directory came from al-Farghani whose greatest accomplishment was the attempt to measure the length of one degree of a meridian. He was close with his calculation of 70.25 miles—the correct figure is actually 69 miles.[4]

The next task for cartographers was to establish a prime meridian, a term borrowed from India. The three principal mapmakers, Yaqut, al-Khwarazmi, and al-Battani, attempted to create uniform longitude and latitude lines. Ptolemy, in the second century A.D., is credited with establishing a grid system on which to create a map and Al-Battani and others borrowed heavily from this idea. In fact, the longitude and latitude given for a specific city by Ptolemy can often be found exactly in the longitude and latitude charts of the Islamic cartographers. Muslim figures can also be seen on European maps well into the seventeenth century. This would seem to indicate that early modern Europeans used not only Ptolemy but also Muslim coordinates when composing their maps.

Another classical source who al-Battani and others must have translated was Macrobius and his map from 400 A.D. (Figure 3A). The late Roman writer divided the earth into five climatic zones which he labeled northern frigid zone, northern temperate zone, torrid equatorial zone, southern temperate zone, and southern frigid zone. His map presented an ocean surrounding a circular world.

The next step in the evolution of Islamic cartography was the tenth century development of the Balkhi school, which included such distinguished mapmakers as al-Istakhri and ibn-Hawqal. The Balkhi school consistently oriented Islamic world maps to the south. Many scholars believe the Muslims wanted Mecca to be above all other locations.[5] Early maps by ibn-Hawqual showed the seven climates, which continued to be found on many Islamic maps for years to come. The number seven paralleled the seven-tiered heaven drawn by many artists of the time.

A comparison of ibn-Hawqal's maps with those of Isidore of Sevilles's T-O map from 630 A.D. and any of the several surviving Beatus maps from the eighth century is fascinating (Figures 5D and 8F). These maps bear a striking resemblance to ibn-Hawqal's map of the world. All three maps show water surrounding the known world in the style of Macrobius (Figure 3A). These maps also represent a highly stylized ecumeme with little concern for specific place locations. The Mediterranean Sea, Nile River, and various other land forms can be seen, but the longitude and latitude points of Ptolemy have been discarded for the most part. Both Beatus and ibn-Hawqal have placed some cities on the map but not necessarily the same ones Ptolemy used (Figure 3B). Artistically, the maps are balanced, regardless of missing geographic locations. Ibn-Hawqal, for

[3] J.B. Harley and David Woodward, *History of Cartography* Vol. 2, Book 1 (Chicago: The University of Chicago Press, 1992), p. 4.

[4] Paul Lunde, "Pillars of Hercules, Sea of Darkness," *Aramco World*, May-June 1992, pp. 15, 16.

[5] Isma'il al Faruqi and Lois Lamya'al Faruqi, *The Cultural Atlas of Islam* (New York: Macmillan Publishing Company, 1986), pp. 162-180.

example, does not show Spain or France although the Muslims were certainly aware of their importance. This represents a distinction between European and Islamic maps: Europeans tended to emphasize the Mediterranean Sea and Palestine while Arabic mapmakers focused on Mecca and the Arabian peninsula.[6]

The next important era of Islamic cartography was ushered in by the most publicized mapmaker, Ash-Sharif al-Idrisi. He blended the scientific knowledge of Ptolemy and his Muslim counterparts with the beauty and distinction of al-Istakhri's maps. Educated in Spain he traveled the world during the early twelfth century. When Roger II became the ruler of Sicily in 1130, he had to choose whether to rule as a Christian king or as a sultan. He chose a Muslim way of rule and surrounded himself with Islam's finest intellectuals. One of these was al-Idrisi.

Al-Idrisi's maps adopted many characteristics from early cartographers, most notably Ptolemy (Figures 3B and 2C). Al-Idrisi's world resembles ibn-Hawqal in its circular shape, southern orientation, and the waters surounding the earth. The seven climatic zones are highly visible in red as established centuries before by ibn-Hawqal, Macrobius, and others. The stylized lines still exist, but many more of Ptolemy's latitude and longitude points are used. When the map is rotated 180 degrees, the world is easily discerned by twentieth-century students.

If Ptolemy's and al-Idrisi's maps are studied side-by-side, more borrowings by the Muslims can be seen. The Nile River is nearly identical, especially the mountains to the far south and the configuration of the tributaries. The shapes of the mountains on al-Idrisi's map also mimic Ptolemy. The northernmost point of al-Idrisi's map looks like Scandinavia, which can also be found on some of Ptolemy's later editions.

Also intriguing are the differences between the two. Al-Idrisi was much closer to the correct length of the Mediterranean Sea. He must have been aware of Ptolemy's miscalculation through his travels. Ptolemy's most publicized error was enclosing the Indian Ocean; al-Idrisi left it open. One other European trait is represented on this Islamic map—the dark colored mountains in the northeast, may be the home of Gog and Magog. As early as the tenth century Islamic mapmakers like Safaqsi placed the region of these mythical creatures on maps.[7]

But whatever European traits this map has, Islamic style still pervades. Mecca and the Arabian peninsula are at the center. Order and balance are secured by the placement of islands in the Atlantic and Indian Oceans. The mountains surrounding Gog and Magog are mirrored along the North Africa coast. Al-Idrisi also remained fairly true to the color code established in 1000 A.D. by al-Muqaddasi who required red to designate routes or grid lines, yellow for sand, blue for rivers, brown for mountains, and green for the sea.[8] One well-known geographic feature does not exist in these specifications. There is no symbol or color to designate fertile areas or grassy plains probably arising from the fact that little grass existed on the Arabian peninsula.

Although many Islamic cartographers followed al-Muqaddsi's color code and used green to delineate oceans, al-Idrisi did not, indicating another European tradition he may have absorbed. The majority of European maps use blue to represent water, as did al-Idrisi. The maps of al-Idrisi show a unique blend of European and Islamic cartographic traditions, reflecting the nature of Roger II's rule.

While all this impressive mapmaking was taking place, relations between Muslims and Christians changed drastically in the political and intellectual arenas. The most obvious change occurred during the Crusades, 1096-1291 A.D. Though Muslims often continued their kind treatment of the Christians, in some regions where the Islamic people believed themselves truly superior, some segregation ensued. Christians were required to wear sashes and were not allowed to display crosses or religious books.[9] Muslims in these areas began to see Christians as polytheistic because they believed in the trinity.[10] These Christians were not usually physically harmed, but were separated from the true believers. In other parts of the empire, the traditional cordiality remained. Actually, Christians often advanced in Islamic society. During the Crusades, the vizier, or chief adviser to the caliph, was Saif al-Islam, an Armenian Christian. Christians did not often reciprocate this treatment. Instead, they began attacking the Muslims. One church official described them as an "unbelieving black-faced brood".[11]

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[6] Harley and Woodward, p. 129.

[7] Isma'il al Faruqi and Lois Lamya'al, *The Cultural Atlas of Islam*, (New York: Macmillan Publishing Company, 1986), pp. 176-177.

[8] Harley and Woodward, p. 7.

More significant than insults, Europeans began to reclaim land and knowledge from the Muslims, reversing 400-year-old policies. The Crusades marked the end of an era. As Crusaders brought back items of value from the Holy Land—the art of glass making as well as gum, yogurt, and chess—political power began to swing to the West.[12] By the twelfth century, so did the intellectual pendulum.

From 800-1100 A.D., Islamic inventiveness was at its peak—scientific inventions, discoveries, and improvements on previous ideas outpaced those in the West. But from 1100-1500 A.D. in this same area of science and technology, the Muslim world suddenly fell behind. The Islamic scholars had lost the edge with no impetus to search for stimulus outside their highly patterned and remarkably stable environment.[13] This loss of creativity and originality is represented in the lack of new Muslim maps. This new attitude is summed up in this quote from ibn Khaldun (1332-1406): "Whoever studies it [logic] should do so only after he is saturated with religious law and has studied the interpretation of the Koran and jurisprudence."[14]

Cartographers must have taken this advice to heart. The prolific mapmaking of the ninth, tenth, and eleventh centuries halted. Beginning with the Ottoman Empire in 1290 mapmaking served only practical purposes—Muslim cartographers created portolan charts for seafaring and produced seize and attack plans for the Ottoman military.[15] A culture that began the Middle Ages with such zeal for learning entered the sixteenth century with only a dim flicker of its past brilliance.

Meanwhile, Europeans took the flame and ran with it. The Psalter map and the Hereford map showed that the West could combine religious thought with science. They continued the traditions of al-Idrisi by portraying a circular world, a heavenly ocean surrounding the earth, and stylized mountains and cities. In 1375, the Catalan atlas used Arabic points to plot the shoreline of the countries which bordered on the Mediterranean Sea. Some of the writings of Aristotle were rediscovered in the late thirteenth century as Thomas Aquinas read the Latin translations by ibn Sina and ibn Rushd.[16] Without these ready sources, no one can predict how long it would have taken for Aquinas to discover and translate the Greek originals, detracting him from other pursuits.

European cartography benefitted greatly from Muslim cartography. The adoption of Ptolemic principles by many Islamic cartographers preserved the Hellenistic tradition. No map or piece of art can be viewed solely as a representation of the time and place in which it was created. It must be studied as it relates to other times, places, and cultures. Just as the study of one branch of the social sciences requires a working knowledge of other branches, art and literature can be enjoyed but cannot be fully understood without an awareness of their historic context. In order to fully appreciate Islamic maps, their roots in Alexander the Great's rule and their eventual influence on the European Renaissance cannot be ignored.

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[9] Ronald C. Finucane, *Soldiers of Faith: Crusaders and Moslems at War* (New York: St. Martin's Press, 1983), pp. 147-173.

[10] Thomas J. Lippman, *Understanding Islam: An Introduction to the Moslem World* (New York: New American Library, 1982), pp. 123-128.

[11] Finucane, pp. 147-173.

[12] R. M. Savoy, ed., *Introduction to Islamic Civilisation* (New York: Cambridge University Press, 1976), pp. 120-126.

[13] Daniel Pipes, *In the Path of God: Islam and Political Power,* (New York: Basic Books, Inc. 1983), pp. 70-88.

[14] L.S. Stavrianos, *The World to 1500: A Global History, 4th Ed.* (Englewood Cliffs, New Jersey: Prentice Hall, 1988), p. 218.

[15] Harley and Woodward, p. 513.

[16] Hayes, p. 66.

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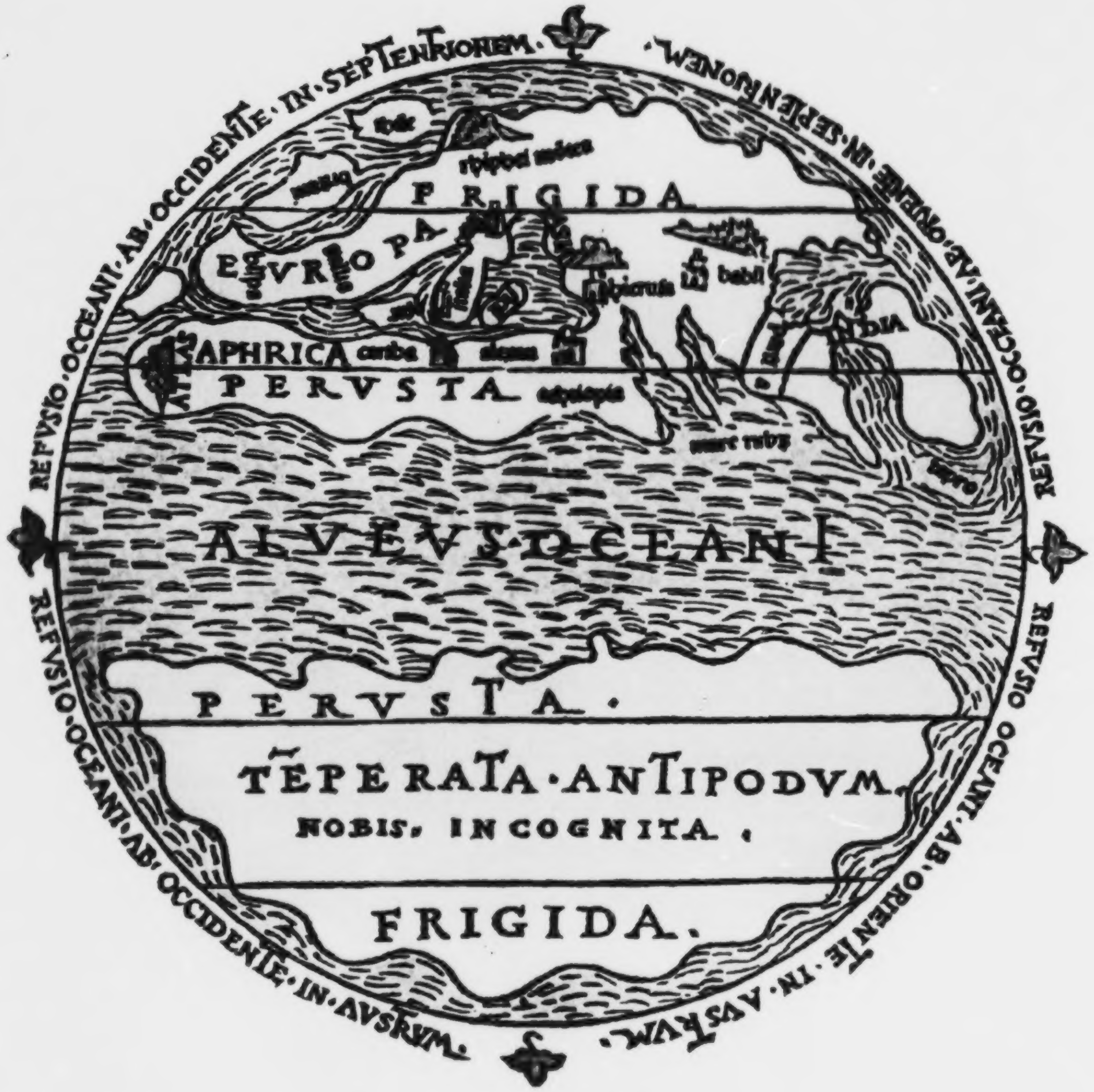
Figure 3A Macrobius: A Neoplatonic View

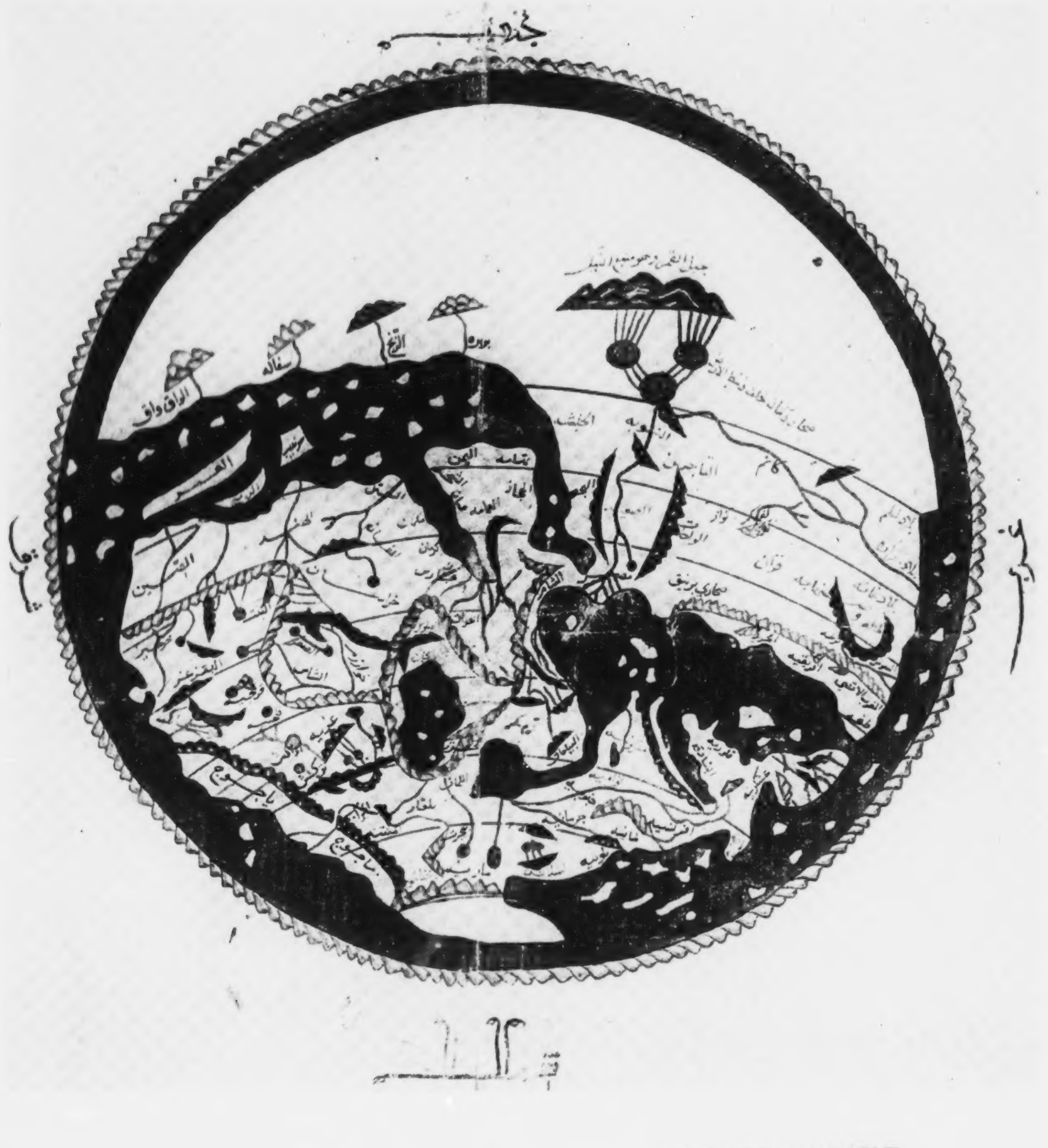

REFVSIO·OCCEANI·AB·OCCIDENTE·IN·SEPTENTRIONEM.
REFVSIO·OCCEANI·AB·ORIENTE·IN·SEPTENTRIONEM.
FRIGIDA
EVROPA
APHRICA
PERVSTA
ALVEVS·OCEANI
PERVSTA.
TEPERATA·ANTIPODVM.
NOBIS, INCOGNITA.
FRIGIDA.
REFVSIO·OCCEANI·AB·OCCIDENTE·IN·AVSTRUM.
REFVSIO·OCCEANI·AB·ORIENTE·IN·AVSTRUM.

(5) MACROBII IN SOMNIUM SCIPIONIS EXPOSITIO,

BRIXIÆ 1483.

© 1991 HarperCollinsPublishers

Al-Idrisi: Map of the World, 1154 A.D. **Figure 3B**



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Chapter Four

The Debate over Global Projections

Raymond M. Brod

In his book *Ways of Seeing Things,* John Berger emphasizes that "the compositional unity of a painting contributes fundamentally to the power of its image." The same concept can be applied to maps. While maps are not pure works of art due to the creative constrictions placed upon the cartographer, these graphic representations of the earth's surface are powerful didactic tools that influence and mold the map reader's image of the world.

One of the reasons maps are so powerful is that they portray information in a striking way. Mapmakers represent their concept of the world by combining colors, symbols, grids, and scales. The amalgamation of these design elements requires the map user to determine the meaning of the symbols, and then to interpret the distribution of these marks, a process that sometimes intimidates the reader.

Not only is perception and cognition of basic map information difficult to process and interpret, but the map user is generally not aware of the difficulties posed by the transformation of a three dimensional sphere onto a plane surface. Herein lies one of the principal areas of deliberate or inadvertent misrepresentation of information. Nevertheless, the problem also presents opportunities and some very creative ideas and applications have come from experimentation with the arrangement of parallels and meridians.

To briefly define and review the creation of projections: as illustrated in Figure 4A, a projection is the transformation of a three-dimensional sphere onto a two dimensional surface made visual by the application of parallels and meridians to symbolize latitudes and longitudes. Map projections are useful for three reasons. First, the three-dimensional globe can be transformed into a two-dimensional surface; second, the earth can be represented in a large variety of scales; and, third, the entire earth's surface can be seen simultaneously on a single sheet of paper.

There are three basic geometric families of projections: cylindrical, conic, and plane (azimuthal). A fourth category, representing most map projections, is mathematically derived. The four primary attributes that a cartographer attempts to maintain when constructing a projection are: correct shape, direction, area, and scale. All of these qualities cannot exist simultaneously on a projection; however, one or two may do so at the same time. It is important, therefore, for the cartographer to determine the application of the projection and choose the projection for its intellectual function as well as its visual structure. All the properties of the map, be they artistic or scientific, are dependent upon the projection, probably the least understood but most powerful element of a world map.

What makes the arrangement of parallels and meridians such a commanding element? The cartographers of the Renaissance recognized this sense of power in the arranged lines and spent a lot of time constructing and evaluating them, always giving them a prominent visual place on their maps. Sam Edgerton, in his article on the heritage of Ptolemaic cartography in the Renaissance, writes that "Even during the Renaissance and well after, certain geometric figures composed of squares, circles, and triangles linked in some sort of grid pattern were considered 'magic' because people thought they contained a clue to the power of God and His master plan of the universe." He adds that the new grid cartography of Ptolemy, especially in the hands of the Roman popes, tended to reinforce faith in the divine mission of Christianity to convert the world.

Cartographers today depend not upon religious innuendo but upon the variability of scale and clever design to give their arrangement of parallels and meridians power. Projections have been developed to focus attention on the center of the map and to highlight particular geographical areas.

The propaganda function of maps has always been recognized, and it is not surprising that in these days of litigiousness the map projection should become a point of contention. In May 1973, Arno Peters, a German journalist and historian, held a press conference in Bonn. He announced that he had developed a map projection (Figure 4B) that would serve all purposes, except navigation. His projection would also right the perceptual wrongs instigated and perpetuated by the Mercator projection in which the industrial-capitalist, mid-latitude, light skinned areas of the world were shown out of proportion to the equatorial, dark-skinned, and developing areas of the world.

The challenge to cartographers was immediate. A multitude of errors and misleading statements concerning the map were exposed, and it quickly became apparent that the map was really a political statement favoring Peters's ideology. No one disagreed that Mercator's projection was out of place anywhere but on a navigator's chart table. In 1943 the *New York Times* called for the abandonment of the projection in the schools, and as Robinson states in his 1985 rebuttal to Peters's map, the Mercator projection "is rarely seen any more in textbooks and school atlases, at least in the United States." Why Peters and his supporters thought they would go unchallenged by the professional cartographic community is still a mystery.

One of Peters's errors is his statement that the map was constructed on the ultimate egalitarian projection and is the only map to have equivalence, or equal area. The projection he chose to develop, if indeed he developed it independently, is a projection initially proposed by James Gall in 1855, and is part of a family of cylindrical equal-area projections developed by Johann Lambert in 1772. Many other equal-area map projections exist, and the now-called Gall-Peters projection is only one. It is also ironic that the only area on the map that is anywhere near true shape is the mid-latitudes, the region whose residents he criticizes for their ethnocentrism.

The claim of cartographic originality by Peters has been disproved by professional cartographers. As Robinson stated in an article on the Peters map, "Crackpot ideas put forward within a profession will soon receive their due. In this case, however, I suspect that may not happen soon, and meanwhile, I think it poses a real danger. Peters's *The New Cartography* is not aimed at the profession; it is intended to appeal to the non-cartographers, and that can be pernicious."

This cartographic controversy has been brewing for almost 20 years, and there is no sign of it subsiding. Some agencies of the UN, the World Council of Churches, and the Lutheran Church of America, as well as other groups interested in third world problems, take the Peters map as their cartographic gospel, thus replacing what Robinson says is the "funny looking Mercator with the funny looking Peters-Gall projection." J.

B. Harley, a historian of cartography, argues that "maps are actions rather than impassive descriptions, to be read as literary texts rather than mechanical replications of technical processes." All parties in the Peters projection controversy understand the seriousness and implications of this statement.

Controversies about map projections and how they should represent the globe are as old as attempts to determine the shape of the earth. Here the term globe is used instead of world because world connotes a social and cultural awareness, while globe implies geometric shape, which was more important to early scientists than any politically correct geographical view of their *oikoumene.*

Parallels and meridians are a necessary element of the projection process if a viewer is to successfully visualize the magnitude of geographical transformation. The arrangement of the parallels and meridians gives the map reader clues to the distortion present in projections, and thus an appreciation of the scale and area variations. The first person to experiment with arranging a grid for a flat map is thought to be Eratosthenes (276-194 B.C.), the mathematician and librarian of the ancient library at Alexandria. Figure 4C shows a reconstruction of this map. His greatest achievement in science was his determination of the earth's size, about 25,000 miles in circumference. Unfortunately, his broad knowledge in many areas earned him the nickname "beta", suggesting second best. His estimate of the earth's size was anything but second best, but it became suspect, superseded eventually by the estimate of Posidonius, which was about 18,000 miles in circumference.

Eratosthenes's system of parallels and meridians approximated a rectangular grid. Placement of lines was determined by locations of leading cities rather than a regular latitude/longitude system that would determine the towns' locations. His map has certain characteristics in common with a cylindrical projection, and it may be considered the forefather of that family of projections.

Practical-minded observers recognized the necessity of creating a more systematic grid scheme for locating points on a globe than Eratosthenes's subjective approach. Several methods were proposed for this purpose, from measuring shadows to celestial point fixing with an astrolabe. This exercise defined what the Greeks called the "climas" or proto-parallels based on the angle of the sun at different latitudes.

Eratosthenes's work and map later came under the scrutiny of Hipparchus, who disagreed with aspects of the work. First, Hipparchus suggested that his method of determining location was faulty and precise astronomical measurements, not travelers' estimates, were the proper scientific procedure to follow. Hipparchus was also critical of rectangular projection in general, arguing that it visually masked the actual shape of the earth.

In order to promote his ideas, Hipparchus developed two projections that reflected the sphericity of the globe. Using the conventional Sumerian 360 degrees, with 700 stadia to a degree, he computed the stereographic and orthomorphic projection, both used to this day.

Claudius Ptolemy, also a librarian at Alexandria, but almost 400 years later than Eratosthenes, was deeply influenced by Hipparchus, and published his *Geographia,* in the second century of our era. One of these volumes was dedicated to the field of cartography. Like Hipparchus, Ptolemy preferred projections that visually represented the earth's sphericity. Examples of his conic and spherical projections are illustrated in Figure 4D. Unlike Eratosthenes and Hipparchus, Ptolemy accepted Posidonius's estimate of 18,000 miles as the earth's circumference.

The following centuries of the first millennium were turbulent, and Ptolemy's works, as well as many others, were either destroyed or disappeared from circulation. In Europe, religious pursuits often replaced scientific inquiry. Gone, at least in Europe, were scientific investigations to systematically structure the earth's surface. The cartographic grid was no longer the preferred system for organizing geography. The earth as revealed in the Bible now provided models for cartographic representation of the inhabited *oikoumene*.

Central to the new cartography (shades of Arno Peters) became the interpretation of the earth's geometry as described in Heb. 9:23-24, Ezekiel 5:5 (Jerusalem as the center of the earth), and Acts 12:47 (the earth's four corners). Lloyd Brown in his book *The Story of Maps* writes "medieval cartography from 300 to 900 A.D. was predominantly Christian in origin and ecclesiastical in conception. It was a distillate of folklore, religious cosmology (a theological explanation of the universe and parts thereof), and an assortment of geographical statistics transcribed, with all the errors, from ancient itineraries."

An energetic promoter of the Christian cosmology, Cosmas of Alexandria, surnamed Indicopleustes, worked to demolish the ideas of infidels like Ptolemy, concentrating specifically on the global earth concept. He developed his own perception of the world based upon theology (c. 548 A.D.), and presented his construction in a visual manner like the early Greek rectangular maps, but kept the surrounding ocean that regularly appeared on descriptions of the cosmos.

Various conceptualizations of the earth coexisted with each other. The venerable "T in O" map, with Jerusalem at the center, was a popular representation of a well-organized and simple world. By the thirteenth century more complex cartographic renditions of the earth appeared, mixing the sacred and profane. One example was the Hereford map compiled about 1275 A.D. The Hereford map is within the genre of the "T in O" map, with Jerusalem in the center, the Mediterranean acting as the downward stroke of the "T," and Paradise at the top (east) of the map. For many years it stood as a classic illustration of high Middle Ages cartography, an approach with little scientific basis. But this position has recently been qualified.

In 1966, Waldo Tobler, in an article appearing in the *Annals of the Association of American Geographers*, compared 155 recognizable locations on the Hereford map (Figure 4E) with these same locations plotted on an oblique orthomorphic projection centered on Jerusalem. His question was simple. How well do the plotted locations correspond between each map? His results, achieved by computer analysis, demonstrate an 84 percent match between the maps. He added that the projection used to test the Hereford map may not necessarily be the best fit. The implications of Tobler's findings concerning the Hereford map are not clear, although one implication could be that this map may be a bridge between the mappae mundi of the early middle ages and the maps of the Renaissance.

In the same article Tobler analyzed the Roselli portolan chart of 1468 (Figure 4F). It has amazed cartographers and geographers that maps like the seemingly structureless Hereford existed alongside the accurate and apparently more scientific Mediterranean portolan charts. This amazement, nurtured by a feeling of twentieth-century superiority, masked a simple idea—just because a projection is not shown does not mean it is not there. After comparing the coastline of the Roselli map with various projections, Tobler rejects the notion that it has no projection and suggested the oblique Mercator as a possible proof.

Tobler's findings concerning the Roselli map lends credence to the idea that scientific cartography existed in the Middle Ages but had to be cleverly buried in ambiguity. Another bit of proof for this notion is that Roger Bacon, like his contemporary Sacrobosco, recorded a calculation for the length of a degree of latitude. It has been suggested that this simple, isolated deed brought to the Dark Ages some degree of scientific definition about the world. Or could these maps have indicated a rebirth of cartography, reflecting a kind of transitional phase based on the "double faith" doctrine of Thomas Aquinas, which said that faith can grow out of both revelation and reason?

Regardless of the state of geography and cartography in the Middle Ages, printing, geographical discoveries, and the recovery of Ptolemy after 1200 years of absence from Europe, reinvigorated the interest in global projections in the fifteenth century. The sixteenth century became the golden age of projection experimentation. The constraining girdle of the world ocean that encircled the "T in O" maps burst. Aristotle's and Ptolemy's geographies were updated, then became obsolete, and new ways to graphically express the Age of Discovery blossomed. Maps were now becoming not only artistic and didactic, but utilitarian. The most famous map to come out of the sixteenth century was the Mercator projection, which remains the basic navigational map.

Why did this energetic response toward the map projection occur? Samuel Edgerton Jr. in his article "From Mental Matrix to Mappamundi to Christian Empire" says that the relationship between geometric and moral rectitude that was so implanted in the Western Christian mind resurfaced. Ptolemy's map, for instance, "satisfied that innate human desire to have the visual image of this world organized according to some higher universal ordering system." The grid became so important that it not only represented a higher moral order, it also represented an integral part of the artistic expression of the cartographer.

Mathematics also gave the cartographer the ability to experiment with the intricate curves that some projections required. Circles, hearts, ovals, and other shapes were used to show the earth's surface as accurately as possible, and as aesthetically as technology allowed. Unfortunately, despite the proliferation of map projections, no treatise specifically about them has survived. Their development must be surmised by analyzing the transformations on the maps themselves.

While cartographers continued to fill the empty spaces on maps with newly discovered lands, the homelands of the explorers became the focus of detailed mensuration and large scale mapping projects. The king of France in the eighteenth century employed the Cassini family to make a detailed survey of the entire realm. It became a multigenerational effort. Subsequently, England connected with France's survey grid, as did the neighboring German petty states. Thus the eighteenth century saw the consolidation of mapping efforts. The discussion about projections now centered on the question of which one to use in order to best portray a specific country or region.

The development in the nineteenth century of governmental units to collect and disseminate data renewed interest in map projections for national atlas production. One of the most innovative ideas, proposed in 1805 by Karl B. Mollweide, a German cartographer, introduced the equal area interrupted projection. The term "interrupted" is a bit of a misnomer because, as one cartographer points out, all maps are interrupted. Still, the projection fulfilled the need for an interesting looking graphic that could accurately show statistical distributions on a worldwide basis. The map is used today in many school atlases.

The twentieth century brought several new developments. Ocean travel popularized the Mercator projection, and it was used to some extent in early American school atlases. In 1943 a *New York Times* article suggested that "Mercator's flat projection of oceans and land masses still serves the ship master, but the time has come to discard it for something that represents continents and directions less deceptively." The article further suggested, with great insight, that "Because all the long-distance navigators from Columbus down sailed more or less east-west we have divided the earth into eastern and western hemispheres. The airplane forces us to think of northern and southern hemispheres because seven-eighths of the land lies north of the equator. We are still sea minded."

In the early 1940s R. Buckminster Fuller decided to experiment with producing a world map with minimum distortion (Figure 4G). He ultimately created the 20-sided globe, technically achieving icosahedronal vector equilibrium, the forerunner of his geodesic dome. Essentially the map was an equal area projection, almost conformal, but not quite, and each edge of a triangle represented an arc of a great circle. He called his map the Dymaxion Airocean World Map.

Like most iconoclasts, he met resistance from the establishment. However, when a March 1, 1943 *Life* magazine issue sold 3,000,000 copies of the map, experts took notice. Fuller's patent attorney notified him that a patent office decision in 1900 ruled no new cartographic projections would be granted a patent because all of "the possible mathematics and projections had already been exhausted." He therefore patented the projection as an invention. Fuller's projection remains a novel idea, sold more to the curious model builder than to globe makers or atlas publishers. Its principal cartographic value is in the proof that there is always one more map projection out there to be designed or invented.

This valuable lesson proved true again in 1963 when Arthur Robinson, the proclaimed dean of American cartography, announced a new projection (Figure 4H). Contracted by Rand McNally, he essentially followed Fuller's methodology by deriving the projection empirically first, then determining the mathematical description later. (Actually Mercator did the same thing, mathematically describing his projection some 30 years after its original derivation). This newest projection has been adopted by both Rand McNally and the National Geographic as their standard method for depicting the globe, replacing a variety of honorable, but more cumbersome world views. The projection is a consensus of the global attributes, being neither completely conformal, equivalent, azimuthal, or equidistant. Perhaps the creation of this projection was some type of wishful metaphor for our world, as the twentieth century tries to reach some type of consensus for survival.

To summarize this quick tour of the history of map projections and the sometimes heated discourse that accompanies their creation: whether the earth's surface is viewed as a precise mathematical model or an imprecise conceptual form, the information is structured on some type of organizational scheme. We all carry personal projections in our mental landscape that are no less valid than the highly precise descriptions constructed by surveyors and cartographers.

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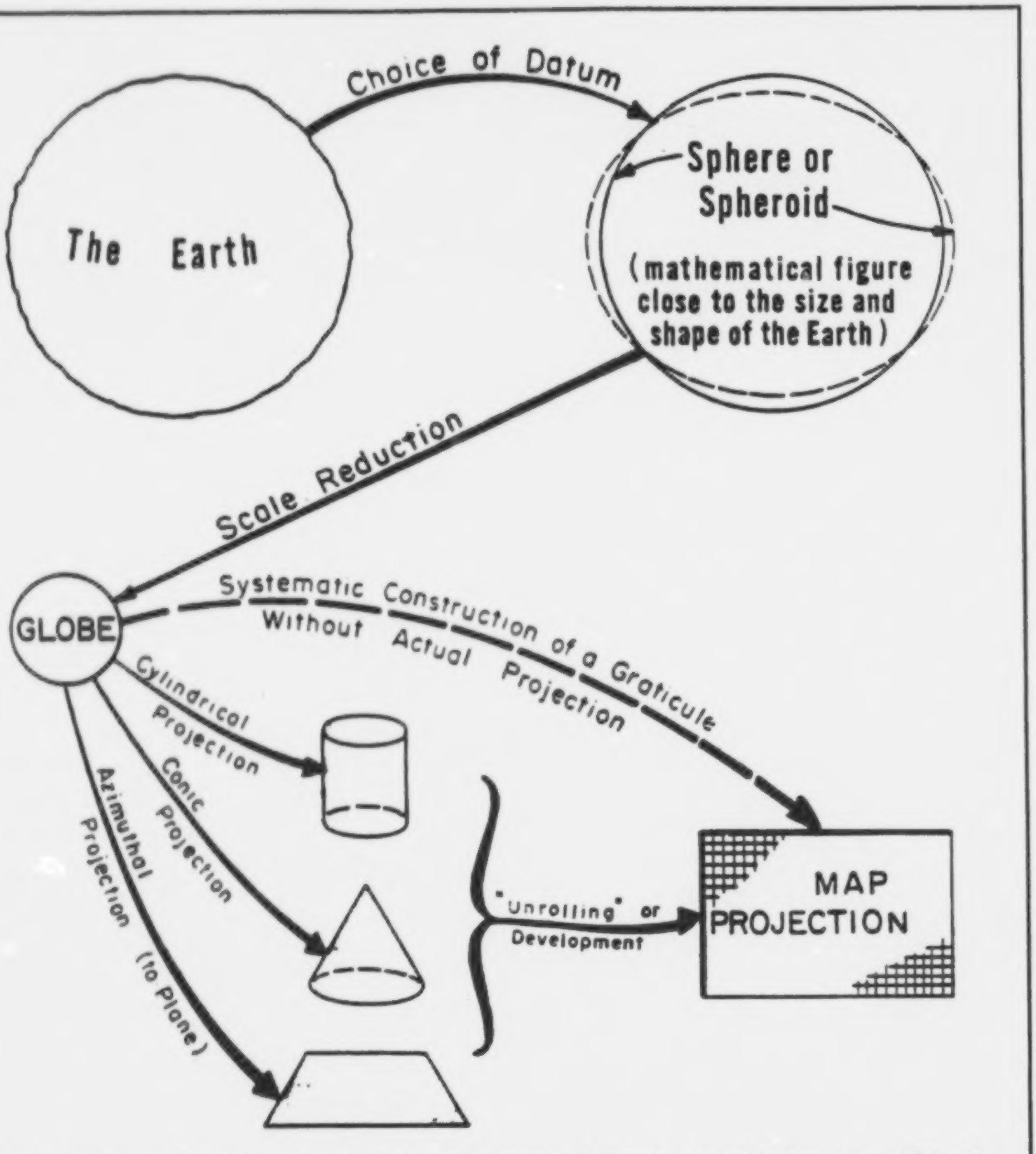
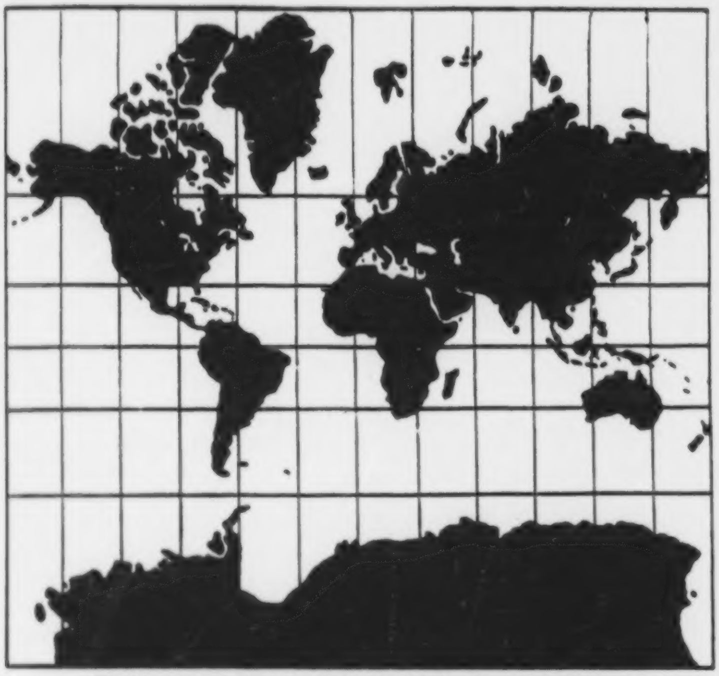
Figure 4A Evolution of a Map Projection


Choice of Datum
The Earth
Sphere or Spheroid
(mathematical figure close to the size and shape of the Earth)
Scale Reduction
GLOBE
Systematic Construction of a Graticule Without Actual Projection
Cylindrical Projection
Conic Projection
Azimuthal Projection (to Plane)
"Unrolling" or Development
MAP PROJECTION

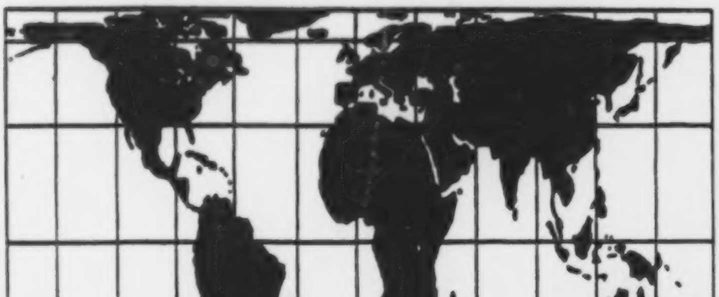
Source: McDonnell, Porter. Introduction to Map Projections. (New York: Marcel Dekker, Inc., 1979) p. 3

A Comparison Between the Mercator and Gall-Peters Projection

Figure 4B



The Mercator projection, devised in 1569 to show the navigator's rhumb, a line of constant oblique direction on the earth, as a straight line on a chart. It cannot show the entire earth because it extends infinitely to the north and south.

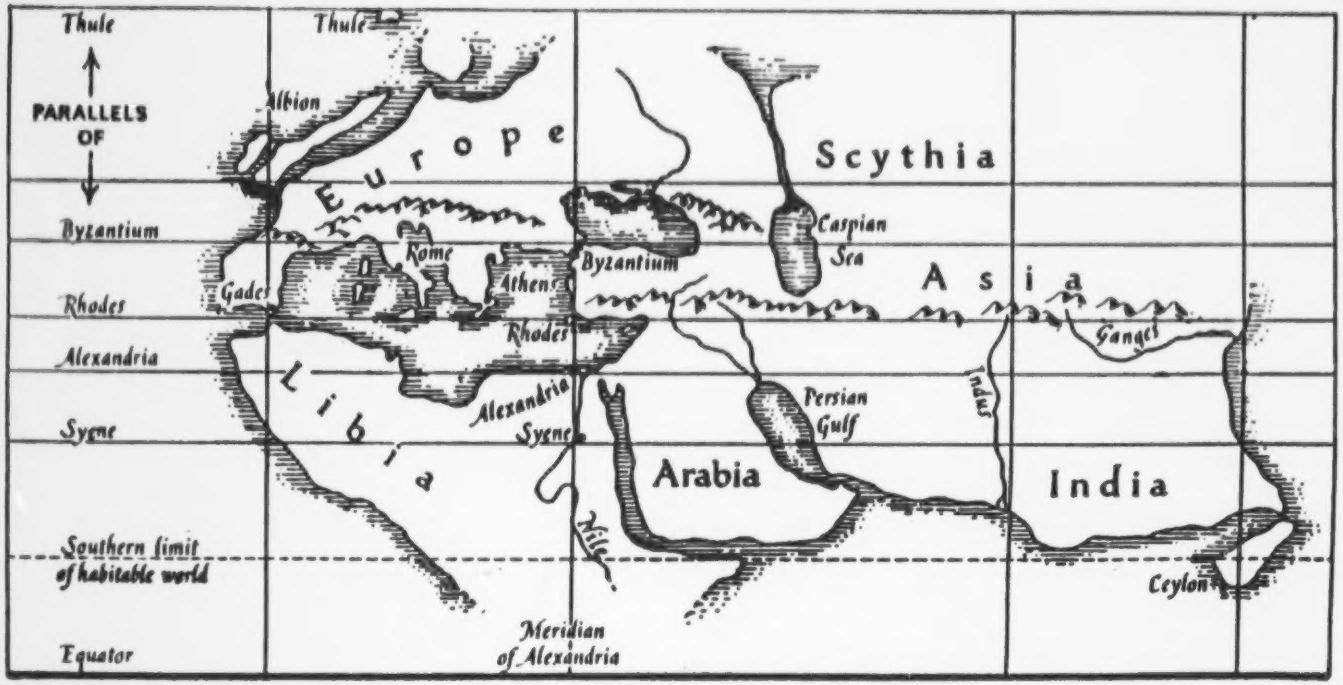


The Gall-Peters projection, a cylindrical equal-area projection with standard parallels of 45°. It was first presented by Gall in 1855, and then by Peters in 1973.

Robinson, 1987

Figure 4C

Eratosthene's Map Was the First to be Drawn on a Framework of Parallels and Meridians


Thule
PARALLELS OF
Byzantium
Rhodes
Alexandria
Syene
Southern limit of habitable world
Equator
Thule
Albion
Europe
Gades
Rome
Athens
Byzantium
Rhodes
Alexandria
Syene
Libia
Nile
Meridian of Alexandria
Scythia
Caspian Sea
Asia
Persian Gulf
Arabia
Indus
Ganges
India
Ceylon

Eratosthenes' Map Was the First to Be Drawn on a Framework of Parallels and Meridians

The original map drawn by Eratosthenes has been lost, but it was described and discussed so extensively by Strabo and other writers of the period that this very accurate modern reconstruction is possible. Eratosthenes believed the equatorial regions were uninhabitable—burned to a crisp.

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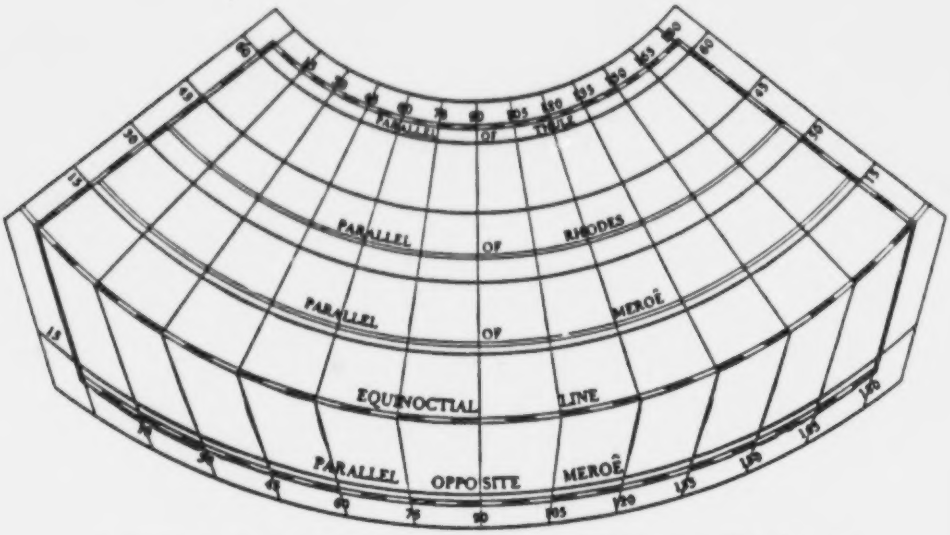
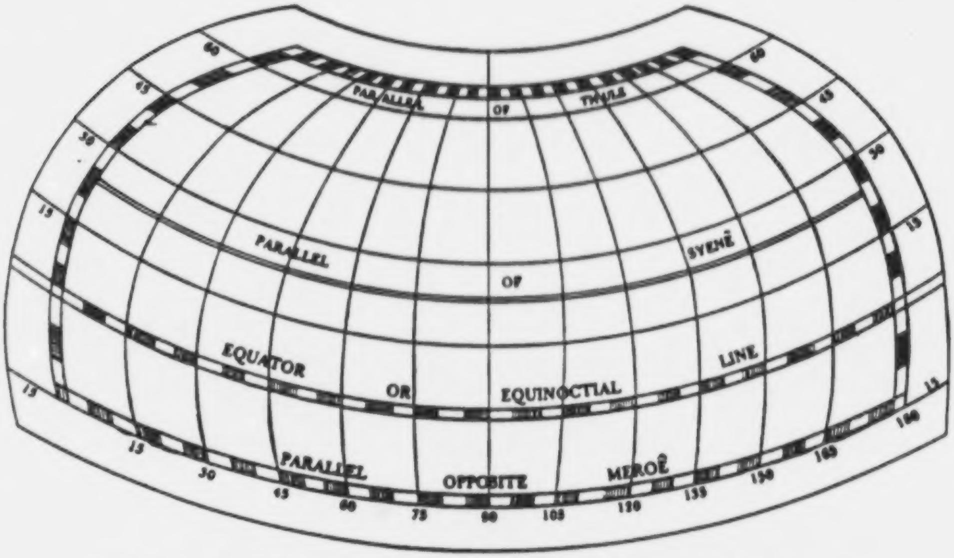
Ptolemy's Projections

Figure 4D

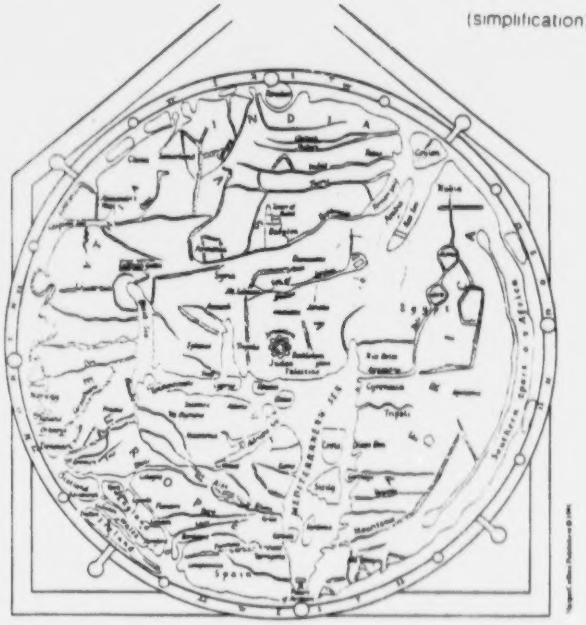

PARALLEL OF THULE
PARALLEL OF RHODES
PARALLEL OF MEROË
EQUINOCTIAL LINE
PARALLEL OPPOSITE MEROË

A reconstruction of Ptolemy's conic projection, suggested for the construction of a map of the habitable world. After a sixteenth-century copy.


PARALLEL OF THULE
PARALLEL OF SYENÊ
EQUATOR OR EQUINOCTIAL LINE
PARALLEL OPPOSITE MEROË

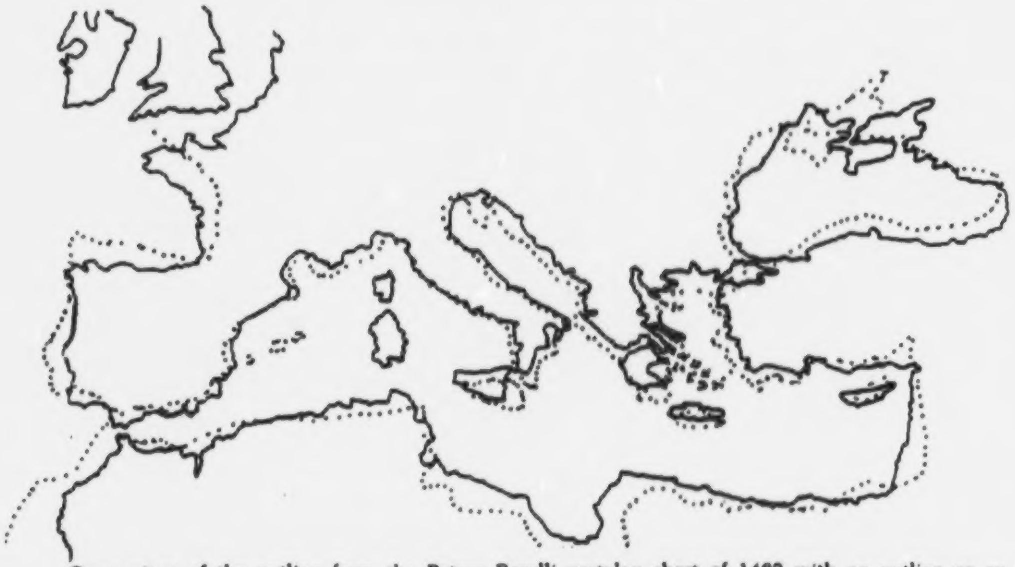
Ptolemy's modified spherical projection of the world, giving a superior likeness of the earth's surface on a sheet of paper. Though preferable to the conic projection, Ptolemy confessed that it was far more difficult to construct.

Figure 4E Hereford Map



(simplification)

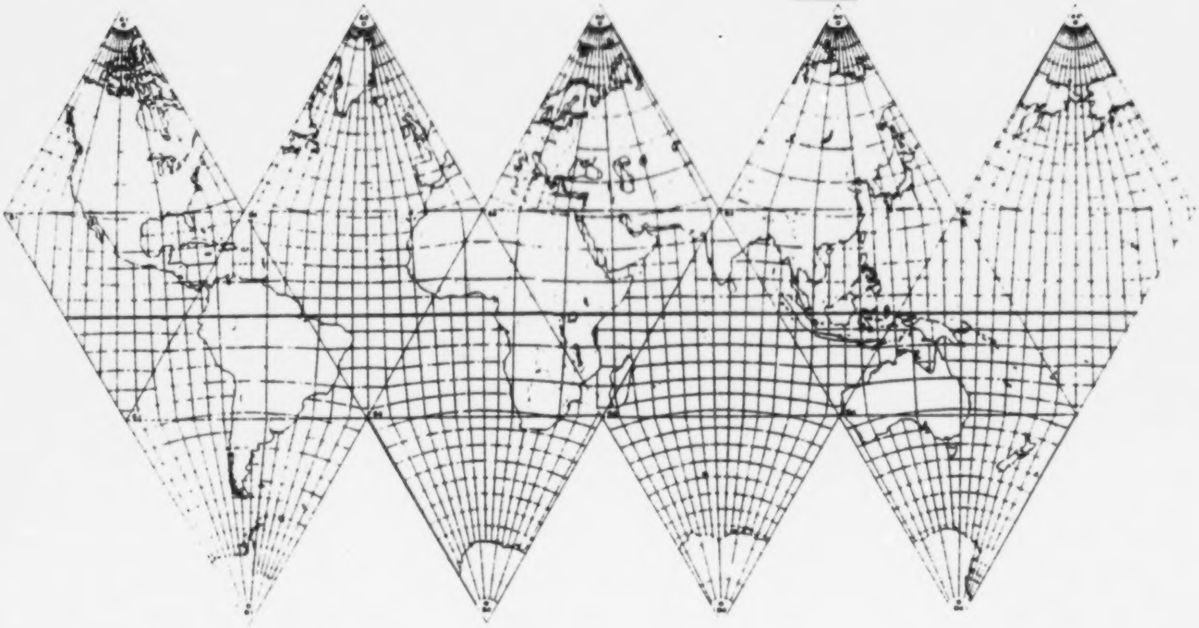
Figure 4F Roselli Map



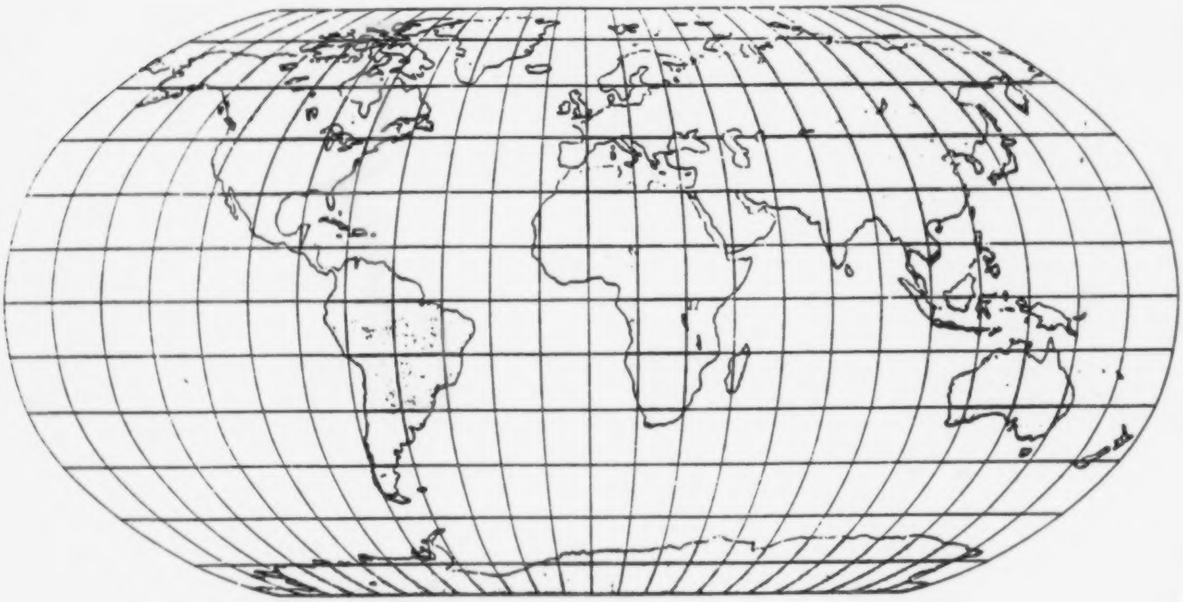
Comparison of the outline from the Petrus Roselli portolan chart of 1468 with an outline on an oblique Mercator projection.

········ Oblique Mercator —— Petrus Roselli (1468)

Fuller Dimaxion Map (section) **Figure 4G**



Robinson Projection **Figure 4H**



Chapter Five

Early Civilizations in the Ancient Near East

John Mullins

Objectives

1. To give students an understanding of ancient river valley civilizations by studying Babylonian and Egyptian cultures.
2. To widen students understanding of Babylonia and Egypt by studying their physical geography and climate.
3. To have students gain proficiency in the use of maps as more than place locators; specifically to use them to understand more of Babylonian and Egyptian culture.
4. To have students understand the use of maps as primary sources in examining early civilizations.

Note: Use handouts of all transparencies for illumination and clarification.

Activities

1. Students read overviews of early Babylonian and Egyptian history in their textbook.
2. Review orientation and the basic elements of maps.
3. Introduce the use of maps as more than locators of places.
4. Ask students to draw the world as they think Egyptians and Babylonians viewed it. Use transparencies on Çatal Hüyük (Figure 5A), Babylonian Map of 500 B.C. (Figure 5B), Ptolemy Map of 200 A.D. (Figure 5C) and a T-O Map (Figure 5D) to illustrate the different ways of conceiving maps.
5. After discussing the maps shown as transparencies have students reexamine them carefully. If time permits, introduce additional maps such as Macrobius and have students analyze them.
6. Divide students into teams acting as archeologists finding the early maps of Mesopotamia and Egypt and interpreting them.
7. Based on students' readings of Mesopotamia and Egypt, ask students what Egyptian and Mesopotamia views of the world might have been. Based on the discussion, students, in groups of four, should draw a map using the elements Egyptians and Mesopotamians would have considered important. Exchange the group maps and discuss them.
8. Ask students to draw a world map from memory. Discuss the students' work with them. Point out their biases, centers, and world view.

Evaluation

Essays or Research Projects

1. Why is the Babylonian Map of 500 B.C. considered significant in the history of early Western civilization?
2. How do maps enhance our understanding of history?
3. Students use portions of the text or research materials from the bibliography to comment on the maps used by the text on Egypt and Babylonia.
4. Ask students to debate the need for a better interpretation of maps by using maps as historical tools rather than simply as geographic locators.

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Çatal Hüyük, c. 6200 B.C.

Figure 5A

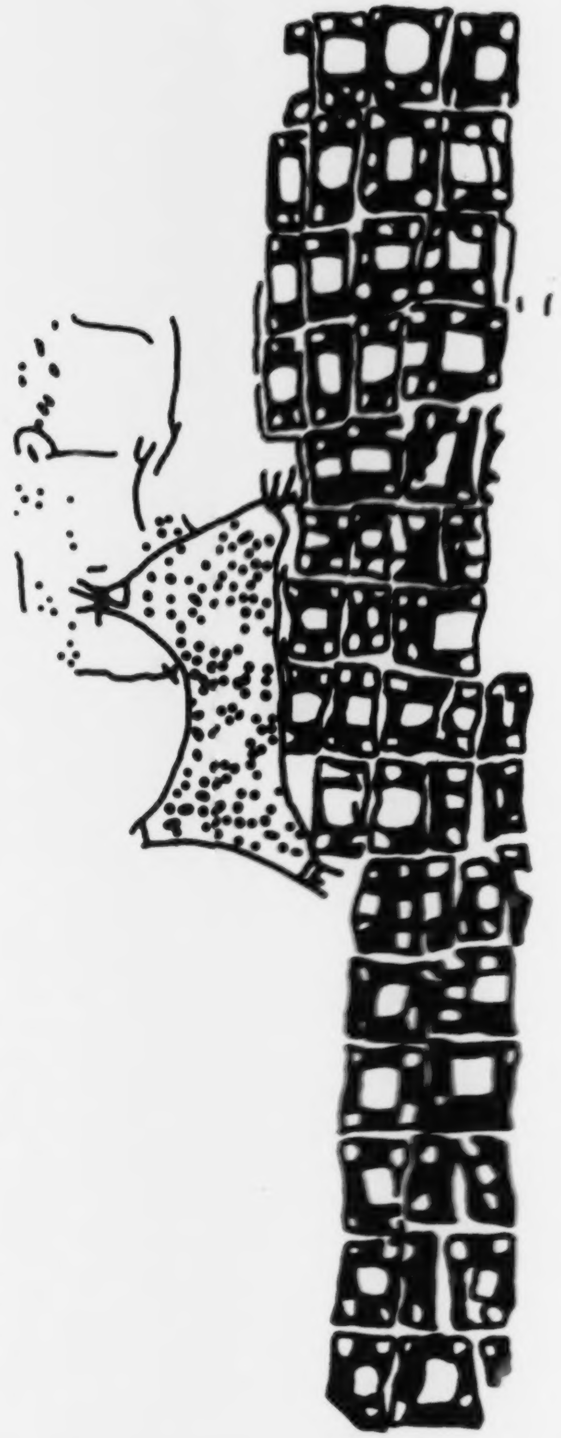

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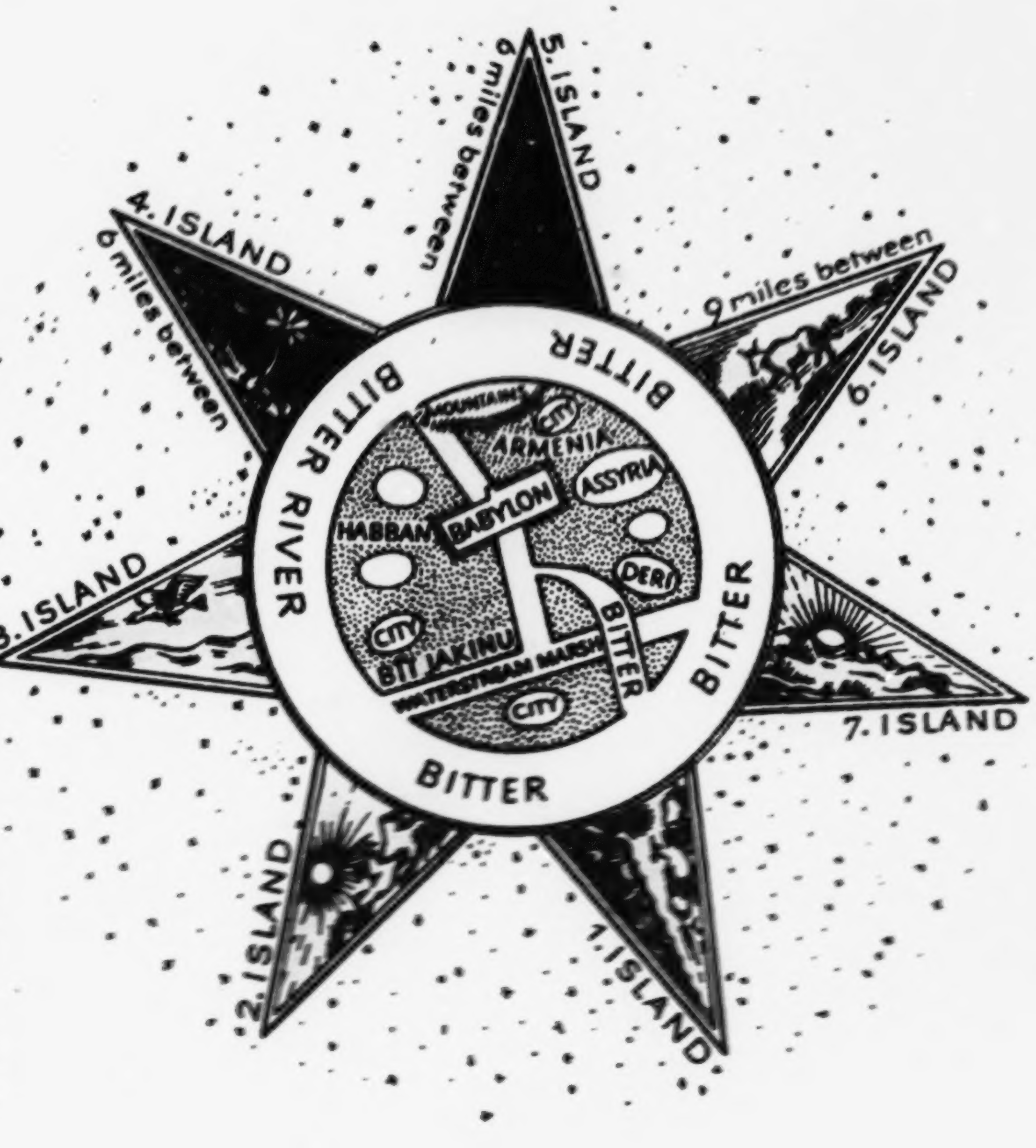
Figure 5B A Babylonian View of the World, c. 500 B.C.


5. ISLAND
6 miles between
4. ISLAND
6 miles between
9 miles between
6. ISLAND
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BITTER
BITTER RIVER
MOUNTAINS
CITY
ARMENIA
ASSYRIA
BABYLON
HABBAN
DERI
BITTER
CITY
BIT JAKINU
MARSH
WATERSTREAM
CITY
BITTER
3. ISLAND
7. ISLAND
BITTER
2. ISLAND
1. ISLAND

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Ptolemy: World Map of the Second Century A.D.

Figure 5C

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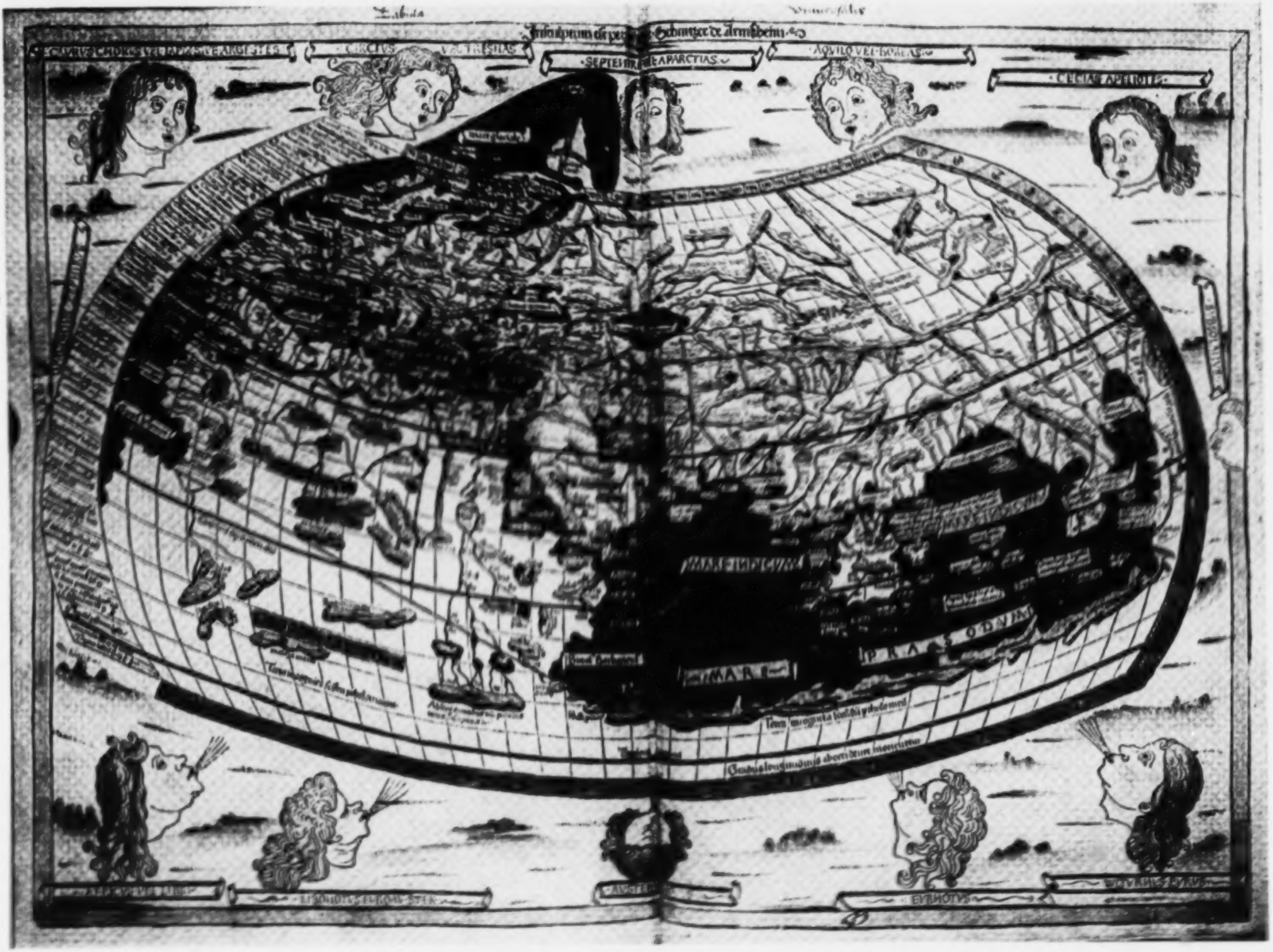
SEPTENTRIO VEL APARCTIAS
AQUILO VEL BOREAS
CECIAS APELIOTES
CIRCIUS VEL TRASIAS
MARE INDICUM
MARE
PRASODUM
AUSTER
EURNOTUS

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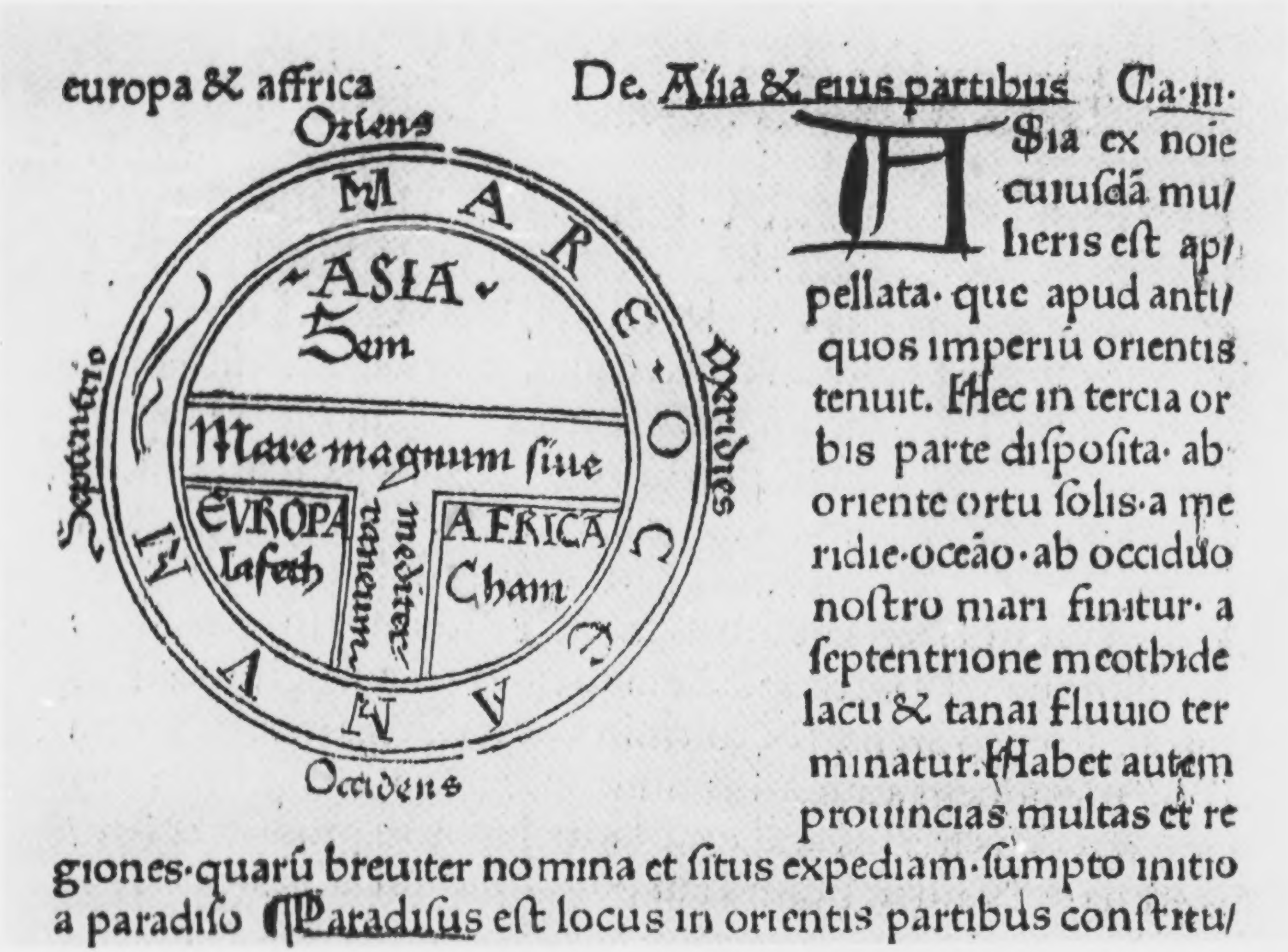
Oriens
MARE OCEANUM
ASIA
Sem
Mare magnum ſiue mediterraneum
EVROPA
Iafeth
AFRICA
Cham
Septentrio
Meridies
Occidens

europa & affrica

De. Aſia & eius partibus ¶Ca·iii·

Aſia ex noie cuiuſdã mulieris eſt appellata· que apud antiquos imperiũ orientis tenuit. ¶Hec in tercia orbis parte diſpoſita· ab oriente ortu ſolis·a meridie·oceão·ab occiduo noſtro mari finitur· a ſeptentrione meothide lacu & tanai fluuio terminatur. ¶Habet autem prouincias multas et regiones·quarũ breuiter nomina et ſitus expediam·ſumpto initio a paradiſo ¶Paradiſus eſt locus in orientis partibus conſtitu/

Figure 5D

Isidore of Seville: A Diagram of the Inhabited World

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Chapter Six

The Earliest World Map

Victoria Goben

Themes:

1. A clay tablet map from Babylonia (Figure 6A) is the oldest known surviving world map.
2. The Babylonian map fits an ancient tradition of world mapping for the Greeks, Romans, and European cultures as well.
3. This map was probably used as a teaching tool: the accompanying cuneiform text suggests it follows Mesopotamian concepts that were used for several millennia.

Skill Objectives:

Students will:

1. Analyze the four parts of the map
2. Learn the word "ecumene" (inhabited earth)
3. Discuss the purpose of a world map
4. Construct an original map using the Babylonian concept as a model

Materials Needed:

1. Background articles: Gerald A. Danzer, "The Earliest World Map, Babylonia, c. 500 B.C." *Social Education*, 55:5 (September, 1991), 304-306. Victoria Goben and her students, "When Did They Make the Would Like This? Discovering New Worlds Through an Ancient Map," *Magazine of History*, 7:3 (Spring 1993), 9-15.
2. Handout A "A Babylonian View of the World" (Figure 6A)
3. Handout B "Student Assignment Sheet" (Figure 6B)
4. Drawing paper (8 1/2"x11") and markers or colored pencils
5. Teacher-made sample of the Babylonian map used to model the lesson.

Focus:

The printed maps made in Europe on the eve of discoveries are best understood and appreciated by looking carefully at cartographic predecessors from the ancient world. The Babylonian map is crucial to such study for it is the oldest surviving world map and reflects a view of the world held for centuries. Discussion of the four parts of the map helps students to focus on the central beliefs about the cosmos. The creation of a student-centered world map, following the Babylonian model, will facilitate the comprehension and appreciation of this early map.

Suggested Teaching Plan

I. Introduction: The Earliest World Map

A. Show the class the overhead transparency of the Babylonian map.

B. Explain this map was made on a clay tablet and is not completely intact.

C. Explain to students that this map is kept at the British Museum where it may be viewed. Explain that extensive studies have been made of this map; the most notable by Eckhard Unger (1937).

D. The map can be well studied, in part, because of the cuneiform text printed on the opposite side of the tablet.

E. The purpose of this map was most likely a teaching tool, perhaps similar to our present-day textbooks.

II. Specifics of the Map

A. Distribute student handout (Figure 6A)

B. Discuss the circle of land on the map. Is the circle an accurate depiction of the land mass in that part of the world?

C. What rivers or place names are recognized by students?

Bitter Rivers

A. Why might the mapmaker have shown the land to be surrounded by water?

B. What is meant by "Bitter River?"

C. What common names do we use for the same type of water body?

The Seven Islands of the Unknown

A. These islands represented lands beyond the ocean that one would come across before reaching the Heavens.

B. The islands were unknown to people. They could not visit them.

C. Discuss the various drawings of the islands. Ask the students what seems to be represented (birds, land animals, the sun, darkness, etc.) Use Figure 6A for this portion of the discussion.

Heavenly Ocean

A. This concept is not drawn on the map. It is explained in the cuneiform text.

B. The middle sketch on Figure 6A shows this Heavenly Ocean. The creatures were gods banished from earth in the new creation order. This shows a hint of change over time.

III. Explanation of the Assignment

A. Summarize the ideas represented on the Babylonian map.

B. Explain to the students that they are going to create a Babylonian-style map. They must decide what is to go on the map to represent the *personal* world in which they live.

C. Show your teacher-constructed model of the map on the overhead. Point out the land area, boundaries, and other geographic features you included.

D. Briefly discuss your seven islands of the unknown.

E. Distribute the student assignment sheet (Figure 6B). Make clear that the map students design is to be significant to them alone. The islands, especially, will vary greatly in what is represented.

F. These maps are to be completed as homework and will be viewed by the entire class on the following day.

IV. **Display of Student Maps**

A. Have students place their completed Babylonian-style maps on the desk surfaces or the teacher may collect and randomly display the maps.

B. Distribute the map analysis sheets; allow students 8 to 10 minutes to move about the classroom viewing the maps and making written observations.

C. Return to seats and discuss the maps, using analysis sheets as a guide.

V. **Further Discussion**

Use these questions as a guide to classroom discussion and to bring the map lesson to closure.

A. What limitations does a map like this have? Does it help find location? Is it a good reference?

B. What common geographic points were used frequently on the class map? Why might these particular sites often recur?

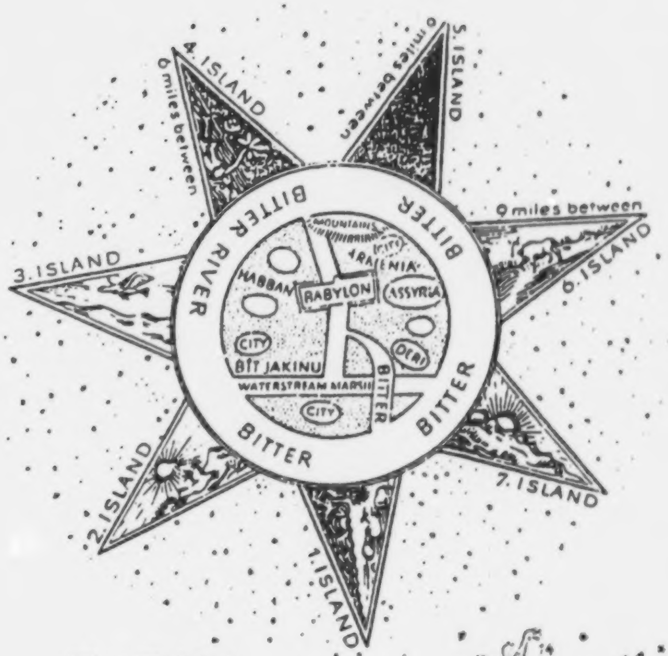
C. Do these original maps show any common themes or similar knowledge?

D. What variety is seen on the islands of the unknown? Were there any common "unknowns" among the student maps?

E. Babylonian maps were most often made on clay tablets. Were there advantages to this? Disadvantages?

F. Is there any similarity between this type of map and the maps we use today? Consider purposes, medium, and geographic features represented.

Figure 6A The Oldest World Map. Babylon, c. 500 B.C.


4. ISLAND
6 miles between
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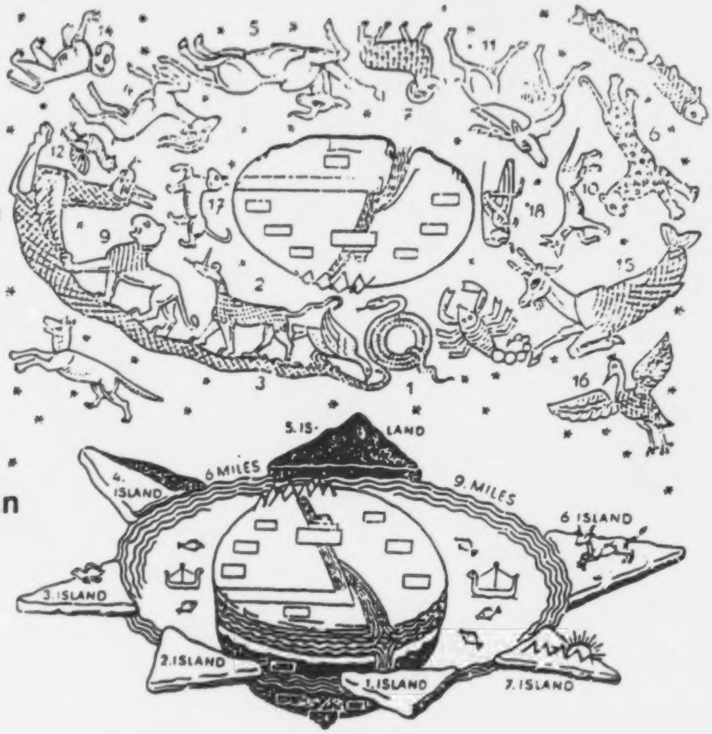
6 miles between
3. ISLAND
6 miles between
6. ISLAND
BITTER
BITTER RIVER
MOUNTAINS
CITY
ARMENIA
HABBAN
BABYLON
ASSYRIA
CITY
DERI
BIT JAKINU
WATERSTREAM MARSH
BITTER
CITY
BITTER
BITTER
2. ISLAND
7. ISLAND
1. ISLAND

The Tablet reconstructed

The Tablet


5. ISLAND
6 MILES
9. MILES
4. ISLAND
6 ISLAND
3. ISLAND
2. ISLAND
1. ISLAND
7. ISLAND

The Babylonian world view

From Eckhard Unger, "From the Cosmos Picture to the World Map," Imago Mundi, II, (1937), 1-7.

Student Assignment Sheet

Figure 6B

A Babylonian Map

Name ______________________________

Class ______________________________

The seven-sided "star" we have been analyzing was a serious and important reference for people in ancient civilizations. This represented the world in which they lived and also what existed beyond their reach. It is a simple map at first glance and yet it says so much about their culture.

Your assignment is to draw an original Babylonian-style map, similar to the one I created and shared with the class. Use the circle/star shape and your own perspective of the world. Will your universe center on your city? your state? your country? Or perhaps the block you live on, or your neighborhood? Any choice is acceptable. Reflect in your mind before drawing the Seven Islands of the Unknown. You saw what is unknown or strange to me. What are the "strange" things for you?

Color your map, and *print* all your words with ink. This is due tomorrow. All maps will be displayed in class, and together we will view and discuss the universe and unknowns for each of you.

Chapter Seven

World Maps and World Views Before Columbus

Victoria Goben

Themes

1. Pre-Columbian maps demonstrate early cartographic images and the subsequent transformation of the world map.
2. Early maps provide examples of the frequent mixture of fact, mythology, and guesswork in their construction.
3. The making of world maps acknowledges that other places exist on earth and are known to the cartographer.

Skill Objectives:

Students will:

1. Identify some elements of five world maps from European, Arabic, and Chinese traditions.
2. Understand that basic world views and concepts are relayed by these maps.
3. Relate these early mapping attempts to the geographic knowledge available at the time.

Materials Needed:

1. Background reading: Gerald A. Danzer "World Maps, World Views and World History," *Social Education*, (September, 1991), 301-303.
2. Transparency of "World Maps for World History" (Figure 7A).
3. Student Handouts:
   a. Duplicate copies of "World Maps for World History" (Figure 7A) for student use.
   b. Direction sheet for student activity (Figure 7B).
4. Drawing paper (11" X 17"), markers or colored pencils.
5. Modern wall map of the world.

Focus:

This lesson introduces early world mapping efforts by several civilizations over a span of 1,500 years. The world concept as shown in these views is significant to the understanding of geographic knowledge on the eve of New World exploration. A brief presentation of the five maps establishes the themes and allows for discussion of their similarities, differences, and changes over time.

Students are directed to create a map of the world from memory. These maps are shared with classmates and then compared to a modern world map.

Suggested Teaching Plan

I. Introduction: World Maps and History

- A. Show the class the transparency of the five world maps. Also distribute a copy for each student to peruse during this presentation.
- B. Ask students to look for similarities in map views A, B, C, and D. What do students notice about each shape? How are land and water represented? How are the maps similar? How are they different?
- C. Do these maps show any political information? Religious information? Social information? How do you know?
- D. What direction is the top of the map oriented towards? How can you tell?
- E. By including three continents and numerous islands, what is the mapmaker acknowledging about the world?

II. Specifics for Figure 7A, Map A: Roman

- A. What body of water projects from the bottom to the mid-center of this map? Why would it be important for the mapmaker to include this body of water?
- B. Ask students to locate Italy on the map. Shade it with colored pencil. (Note: Make sure that the Italy students are locating is a geographic one and that they understand the contemporary nation-state of Italy did not exist at the time of Rome.)
- C. What rivers or other bodies of water do students recognize from the map? Encourage them to find the Danube, the Nile, and the Tigres and Euphrates rivers. Shade these rivers and the Red Sea.
- D. What land forms or continents do students recognize, either by shape or position, on the map? (For example, England, Ireland, Spain, Greece, Egypt, etc.)

III. Specifics for Figure 7A, Map B: European T-in-O

- A. Have students shade the "T" formation one color and the "O" formation another. Ask why the name "T-in-O" would be an appropriate one for this type of map.
- B. Why is Jerusalem the center of the world? Also study the top of the map. Who might be the figures in Paradise? How might we be able to infer this? Can we infer from the map what religion the mapmaker might have been? How?
- C. Do you recognize what the rectangles on the map mean?

IV. Specifics for Figure 7A, Map D: Arabic

- A. How is this map different from Map B? What ocean is included on this map? Why might it be included?
- B. Shade the Mediterranean Sea. How do you know where it is?
- C. What might the three circles in the Mediterranean Sea represent?
- D. Why would an Arabic map depict Africa in the opposite direction compared to the Roman and European maps?

V. Specifics of the Ortelius Map (Figure 7A, Map E)

A. What obvious differences do you see between this map and the four previous ones? List these differences. What similarities do you see?

B. Circle some of the place names noted in the New World (e.g., Peru, Tierra del Fuego, California, Mexico).

C. What system of locating positions on this map is used? How is the numbering different from present-day maps? Why?

D. Direct student attention to the map name found in the lower left-hand corner. Urge them to deduce from the Latin inscription the title of the map: "MAP of the WORLD."

VI. Explanation of the Student Assignment

A. Distribute the assignment sheet and drawing paper.

B. Explain the concept of a mental map. Everyone creates maps in their memory so that simple tasks such as finding one's way around the house, the neighborhood, or town need not be constantly relearned.

C. As students follow along on an assignment sheet, explain that they are to draw a world map from their memory. They should put in continents, oceans, seas, and other bodies of water and landforms as they remember them.

D. Any orientation or perceptions are acceptable. There is no correct mental map.

VII. Presentation of Mental Maps

A. Have students display their mental maps.

B. Use a similar strategy as followed for the five world maps: discuss the similarities, differences, orientations, and features of the students' maps.

VIII. Further Discussion

A. Have students discuss what was most difficult in drawing a mental map. Was it trying to remember shapes? Locations? Deciding what to include?

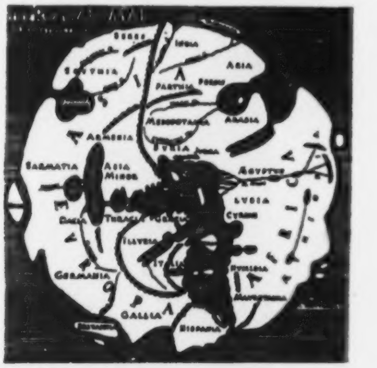
B. What knowledge do your students possess that early mapmakers did not? Did having this knowledge make the assignment more or less difficult? Why?

IX. Extensions:

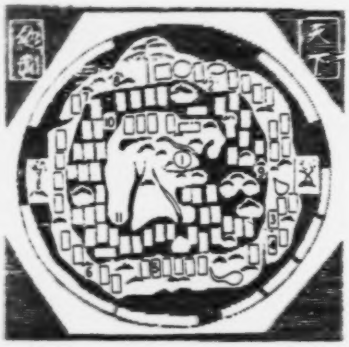
A. Encourage interested students to use other reference sources and study additional old maps, including those that are B.C. (B.C.E.) as well as A.D. (C.E.).

B. Have small groups of students prepare a brief report on early exploration and mapping by various civilizations, including African, Arabic, European, Far Eastern, and Indian maps.

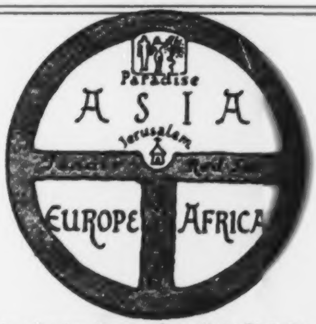
Figure 7A World Maps for World History


SERES
INDIA
ASIA
SCYTHIA
PARTHIA
PERSIS
ARMENIA
MESOPOTAMIA
ARABIA
SYRIA
SARMATIA
ASIA MINOR
AEGYPTUS
DACIA
THRACIA
LYBIA
CYRENE
ILLYRIA
ITALIA
GERMANIA
GALLIA
HISPANIA

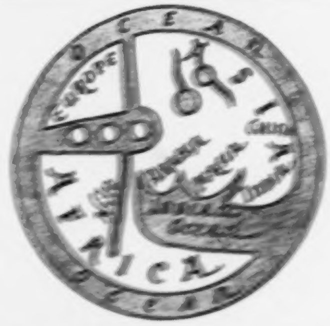
(A) A reconstruction of a Roman map drawn during the reign of Augustus Caesar. No original of this map has survived. (Drawn from conjecture.)



(C) A redrawing of a traditional Chinese map from about 500 A.D.

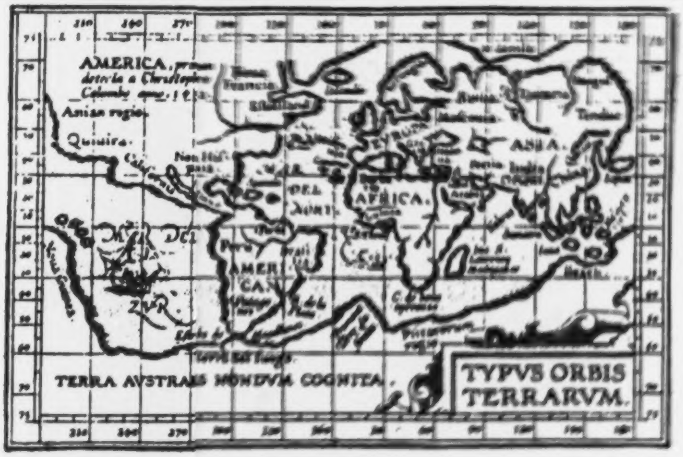

Paradise
ASIA
Jerusalem
Red Sea
EUROPE
AFRICA

(B) A typical medieval world map, often called a T-in-O (Orbis Terrarum) map. Note how land dominates the image of the earth.


OCEAN
EUROPE
ASIA
AFRICA

(D) A redrawing of an Arabic world map (about 1000 A.D.) that served as a school map.

The Roman map, T in O map, Chinese map, and Arabic map are from General Cartography, by Erwin Josephus Raisz, 2d edition, McGraw Hill, 1948, pp. 6, 13, 14, 17


AMERICA
Quivira
ASIA
AFRICA
AMERICA
MAR DEL ZVR
TERRA AVSTRALIS NONDVM COGNITA
TYPVS ORBIS TERRARVM.

(E) A miniature map of the world drawn by the celebrated cartographer Abraham Ortelius in Antwerp in 1606.

Student Assignment Sheet

Figure 7B

Drawing a Mental Map

The view of the world has constantly changed as humans enhanced their ability to explore and communicate the information gained by exploration. Inside every mind is a set of maps that evolves as we each gain knowledge of our surroundings.

Your assignment today is to draw a mental map of the world—the one you picture inside of your head.

Do not peek in books or look at wall maps. The purpose of this exercise is to draw from MEMORY ALONE to the best of your ability. You have seen five ancient maps—now show us how YOU would put the world on display. Any viewpoint or orientation is acceptable as long as it is your mental image of the world.

After sketching the world map, please outline it in dark pencil or marker for clarity. Color the map. Add as many details as you feel are significant. If you use symbols, do not forget a map key.

Chapter Eight

Ancient and Medieval Maps for Classroom Discussion

Charles Hart

The purpose of this activity is to give students an opportunity to view ancient and medieval maps and draw conclusions about how Western civilization's view of the world evolved.

Discuss what can be determined about the culture that created each map (with the exception of Figure 8A). The maps can be found in Gerald Danzer and David Buisseret's *Discovering Western Civilization Through Maps and Views* (HarperCollins, 1991).

The Biblical Conception of the World (Figure 8A)

Procedure

Use this activity as a break from the other maps. Have the students design a map based on quotes from the Bible—Job 9:6-8, Job 26:11, Prov. 27:20, Isa 5:14, Psalms 6:5, Genesis 7:11, Ezekiel 1:1. In groups of three, students should design a map of the world based on biblical description. Students are to submit their design, convert it to a transparency, and then ask each group to explain their map to the class. Tell students each illustration should depict:

- heaven, earth, and the netherworld
- posts supporting the earth and the heavens
- the earth as geocentric

Remind the students to take into account the architectural knowledge and cultural values of the map designers. After each group has discussed their maps, share Figure 8A with the class.

Ptolemy's Map (Figure 8B)

Background

Explain that none of Ptolemy's original manuscripts from the second century C.E. survive and are depicted here as interpreted by late medieval thinkers. Note that while he says the earth is predominantly water-covered, he shows a preponderance of land. Also explain how the circumference of the earth came to be estimated at 18,000 miles (4,000 cubits to the mile).

Questions

1. Why is it important to note that this is an interpretation of a no longer existing map? Can you see any evidence of a medieval bias in this map?
2. What is remarkably accurate about this map? How is it vastly improved over the previous world view?
3. What are the most glaring errors in this map?
4. What conclusions can be drawn about trade from this map?

Macrobius: A Neoplantonic View (Figure 8C)

Background

This map was originally produced about 400 A.D. and this interpretation was published in 1483. Neoplatonists believed that the universe is transient and the earth is only a way station on the path toward immortality. There are five zones depicted: the northern and southernmost zones are too cold for habitation and the middle zone is too hot; people live only in the temperate zones. The water in the Alveus Ocean is too hot to allow passage—the word *perusta* means inflamed. The water clashing at the poles causes the tides. There are three countries identified in Europe: Hispa, Gallia, Italia. The city in northern Italy, Brescia, is where the map was made.

Questions

1. How does the cartographer's neoplatonist beliefs affect the map?
2. How is this map different from Ptolemy's map?
3. How is this map more advanced than the previous map?
4. What are the names of the continents?
5. What modern-day terms on this map have survived to the present?

Cosmas Indicopleustes (Figure 8D)

Background

This sixth-century map was created by a Christian monk in Egypt from descriptions in the Bible. Since the Bible suggested that the tabernacle was the pattern for truth, and because the Bible refers to the four corners of the earth, Cosmas believed the earth was a rectangle.

Questions

1. What is the map's orientation and how is this different from earlier maps?
2. Where was Cosmas' homeland?
3. What is familiar in this map?
4. What is unfamiliar in this map?
5. What is scientifically and observably inaccurate about this map?
6. Do you believe this map was widely accepted during its time?

T-O Map (Figure 8E)

Background

This mappaemundi (map of the world) by Bishop Isodore of Seville was originally done in the middle of the seventh century and reproduced in the fifteenth century. It is an attempt to arrange the earth according to Christian concepts. The continents are named for the sons of Noah.

Questions

1. Which direction is up? A glance at the map shows the origin of the phrase "orient."
2. Identify the waterways.
3. Where would Jerusalem be?
4. How does this map reflect the values of the era?

Beatus: The Four Corners of the Earth (Figure 8F)

Background

Beatus was an eighth-century Benedictine abbot. He created a map with four continents, taking seriously the "four corners" reference in the Bible.

Questions

1. Describe the map.
2. How has the attitude toward the world changed since this map was made?
3. Where are the Garden of Eden, Mediterranean Sea and Jerusalem on this map?
4. What is the significance of how Adam and Eve's nakedness is covered?
5. What sources appear to be used in putting together this map?

Al-Idrisi Map (Figure 8G)

Background

Ash-Sharif al-Idrisi was a twelfth century Islamic traveler from Cordoba. He visited much of the Mediterranean area, England, France, and perhaps central Asia. This map was made in Sicily.

Questions

1. What is the orientation of this map? (Islamic custom always places south on top.)
2. What cartographic advancements are present here?
3. Where is the map the most accurate?
4. What are the glaring errors on this map?
5. What earlier maps may have been used to put this one together?
6. How does this map reflect people's values?

The Psalter World Map (Figure 8H)

Background
This thirteenth-century map has a diameter about the size of your palm. Note Christ's position.
Questions
1. What is this map's orientation?
2. How is it an improvement on previous maps?
3. What are the limits of the known world?
4. What appear to be the areas of greatest familiarity and interest on the map?
5. How is it similar to the familiar T-O map?
6. Locate the following on the map: Paradise, the Mediterranean Sea, Sicily, the Nile River, Jerusalem, the Red Sea, the Danube River, and Rome.
7. What other cities on this map are given an importance equal to Rome?
8. What do the "people" to the south represent?
9. In what way is commerce apparent?

The Hereford Map (Figure 8I)

Background
This is one of the most famous maps of the premodern world, made in the thirteenth century.

Questions
1. What is the orientation of this map? How does it remind us of a T-O Map? What is located at the top of this map?
2. How is the map divided? Which continents are mislabeled? What is in the map's center?
3. How have mapmaking skills improved since this map's creation?
4. How has the view of the world expanded over the Psalter world map?
5. Where is the greatest detail and the area of most familiarity on this map?
6. What are the major points of interest on this map?

A Globe by Johannes Schöner (Figure 8J)

Background
This is one of the oldest surviving world globes and was made in 1520. Spain and Africa are to the right. Newfoundland is on top. Terra de Cuba is actually Florida and Isabella will later be called Cuba.

Questions
1. Why is this map significant?
2. What new information is included on this map?
3. Where is Cipangu? What is its modern name?
4. What are the two oceans called?
5. If you were a sea captain or monarch or merchant, would this map encourage you or discourage you from exploring?

The Biblical Conception of the World **Figure 8A**

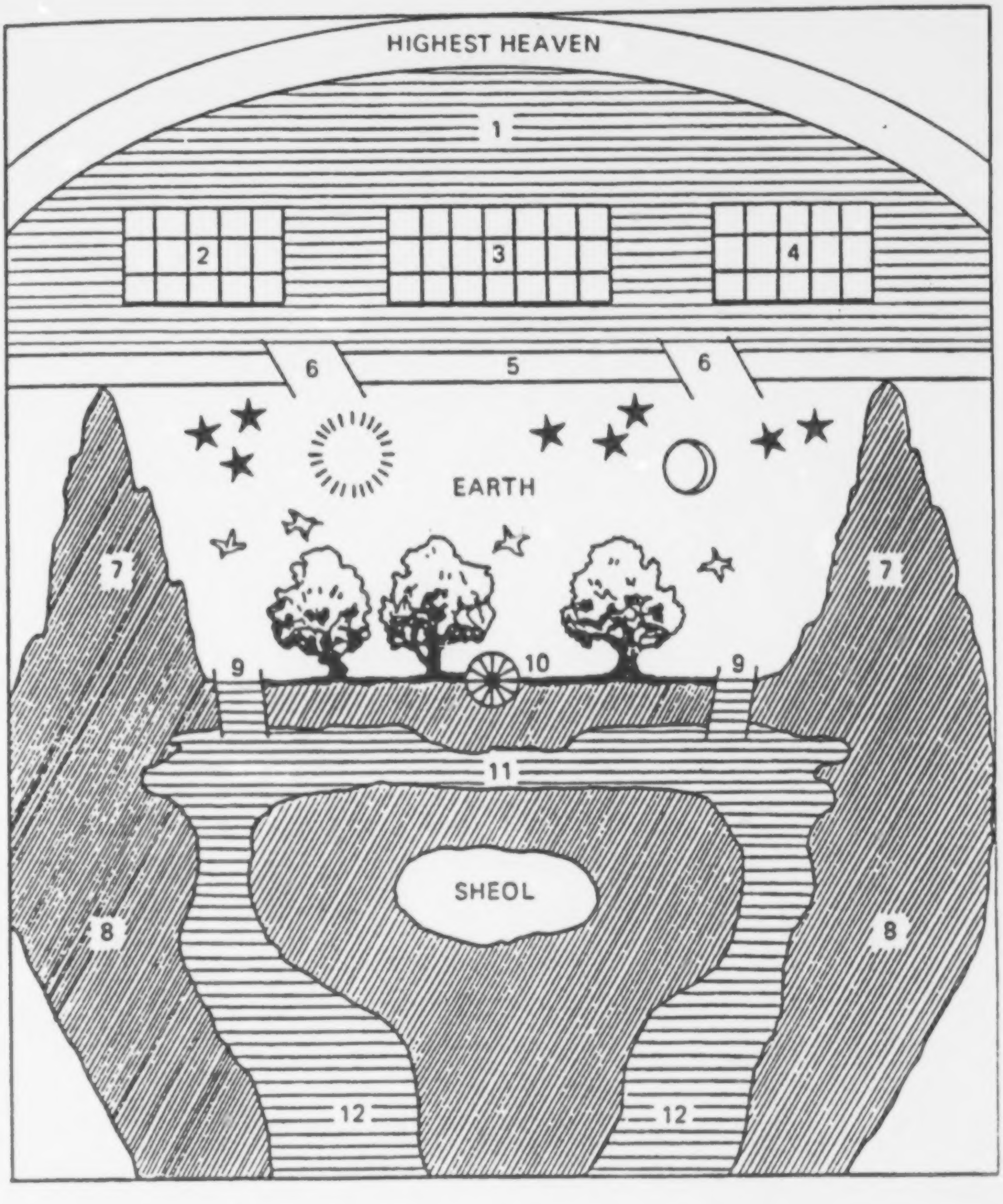

HIGHEST HEAVEN
1
2
3
4
5
6
6
EARTH
7
7
9
10
9
11
SHEOL
8
8
12
12

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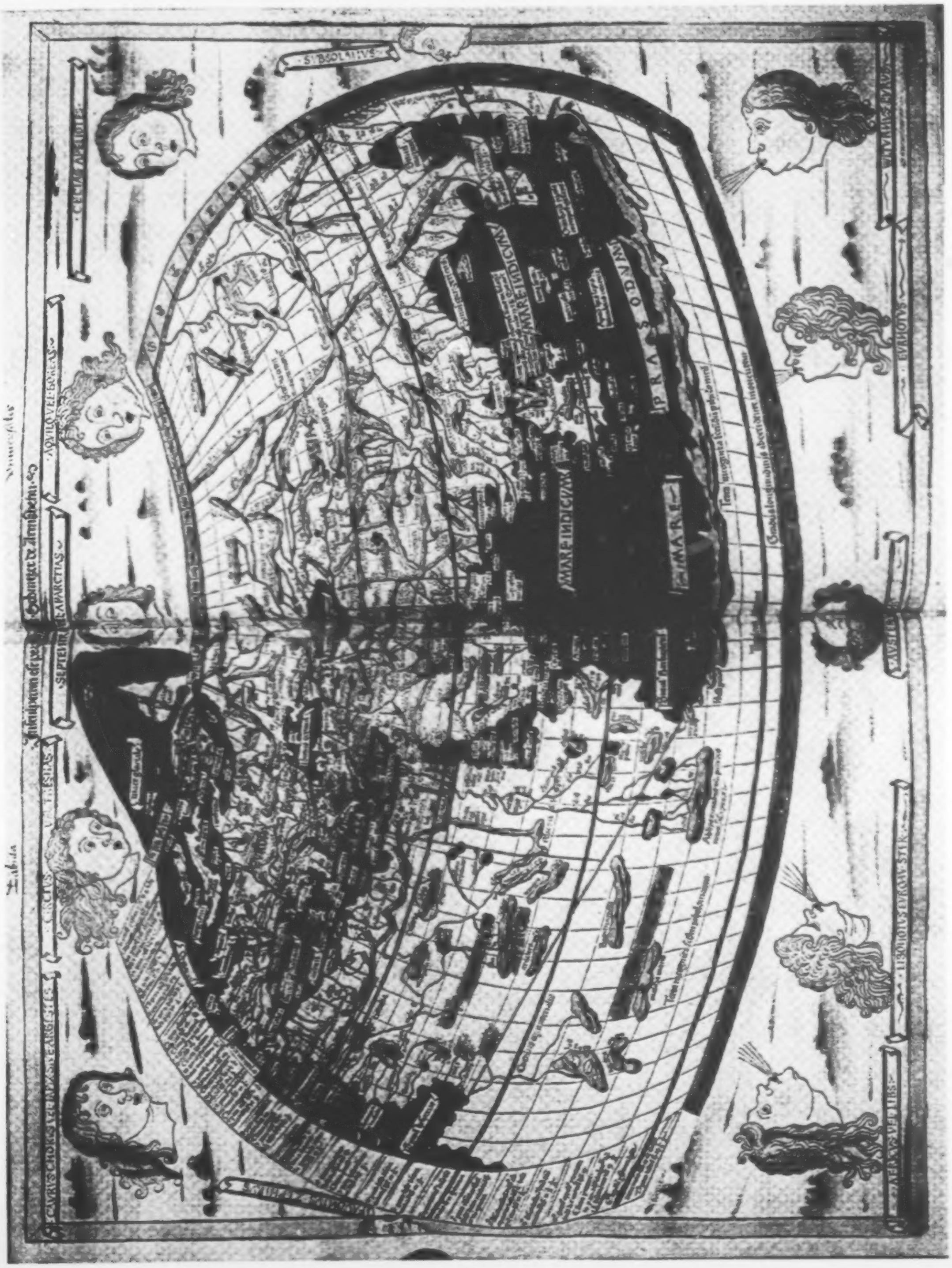
Figure 8B Ptolemy: World Map of the Second Century A.D.


SEPTENTRIO
APARCTIAS
AQVILO VEL BOREAS
CECIAS APELIOTES
SVBSOLANVS
CIRCIVS
CAVRVS CHORVS
ASIA
MARE INDICVM
MARE INDICVM
PRASODVM
MARE
AFRICVS VEL LIBS
AVSTER
EVRONOTVS

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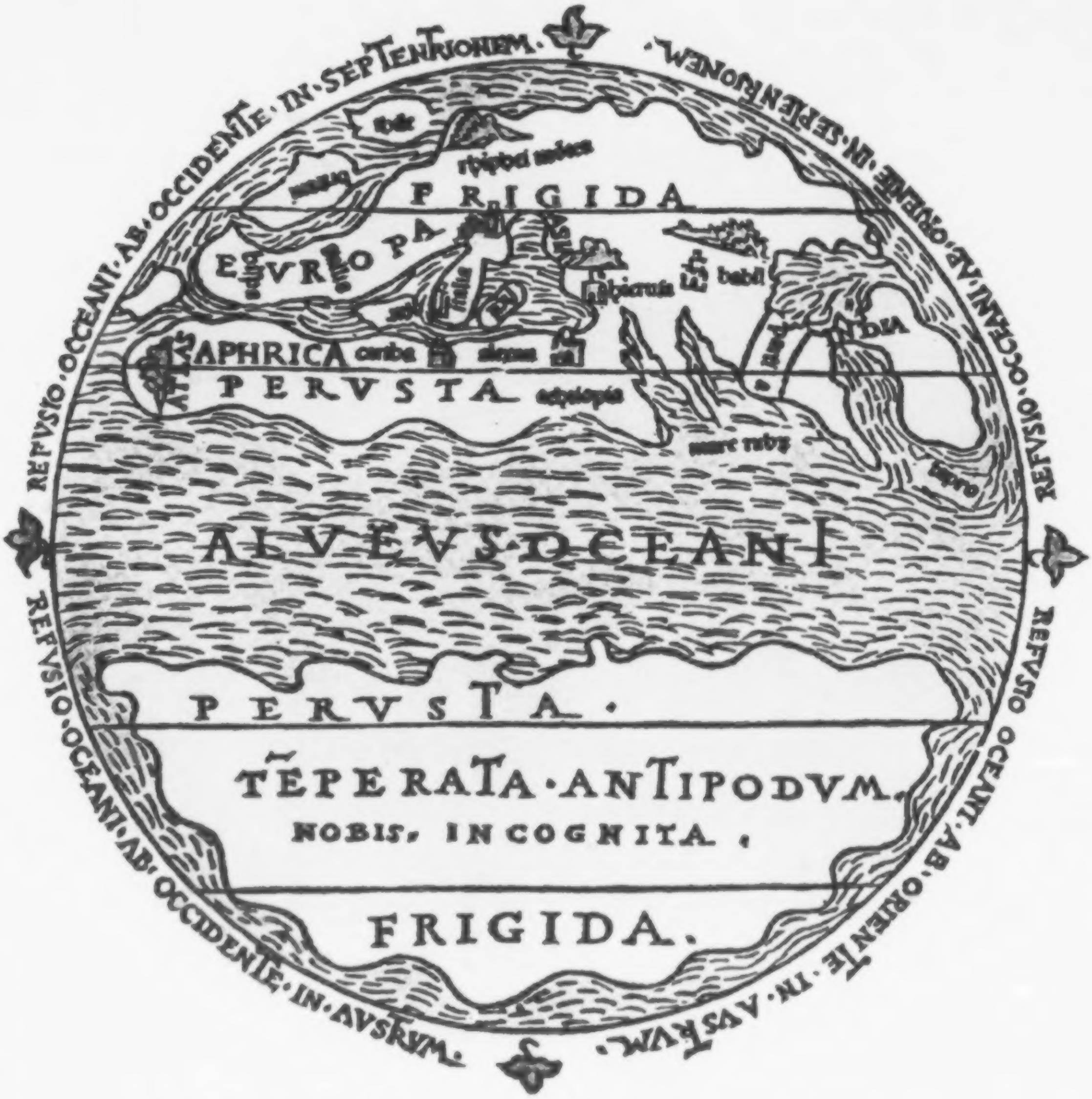
Macrobius: A Neoplatonic View **Figure 8C**


REFVSIO · OCEANI · AB · OCCIDENTE · IN · SEPTENTRIONEM ·
REFVSIO · OCEANI · AB · ORIENTE · IN · SEPTENTRIONEM ·
FRIGIDA
EVROPA
ASIA
babil
INDIA
ATHLAS
APHRICA
PERVSTA
ALVEVS OCEANI
PERVSTA ·
TĒPERATA · ANTIPODVM ·
NOBIS · INCOGNITA ·
FRIGIDA ·
REFVSIO · OCEANI · AB · OCCIDENTE · IN · AVSTRVM ·
REFVSIO · OCEANI · AB · ORIENTE · IN · AVSTRVM ·

(5) MACROBII IN SOMNIUM SCIPIONIS EXPOSITIO,

BRIXIÆ 1483.

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Figure 8D Cosmas Indicopleustes: Map of the World, Circa 548 A.D.

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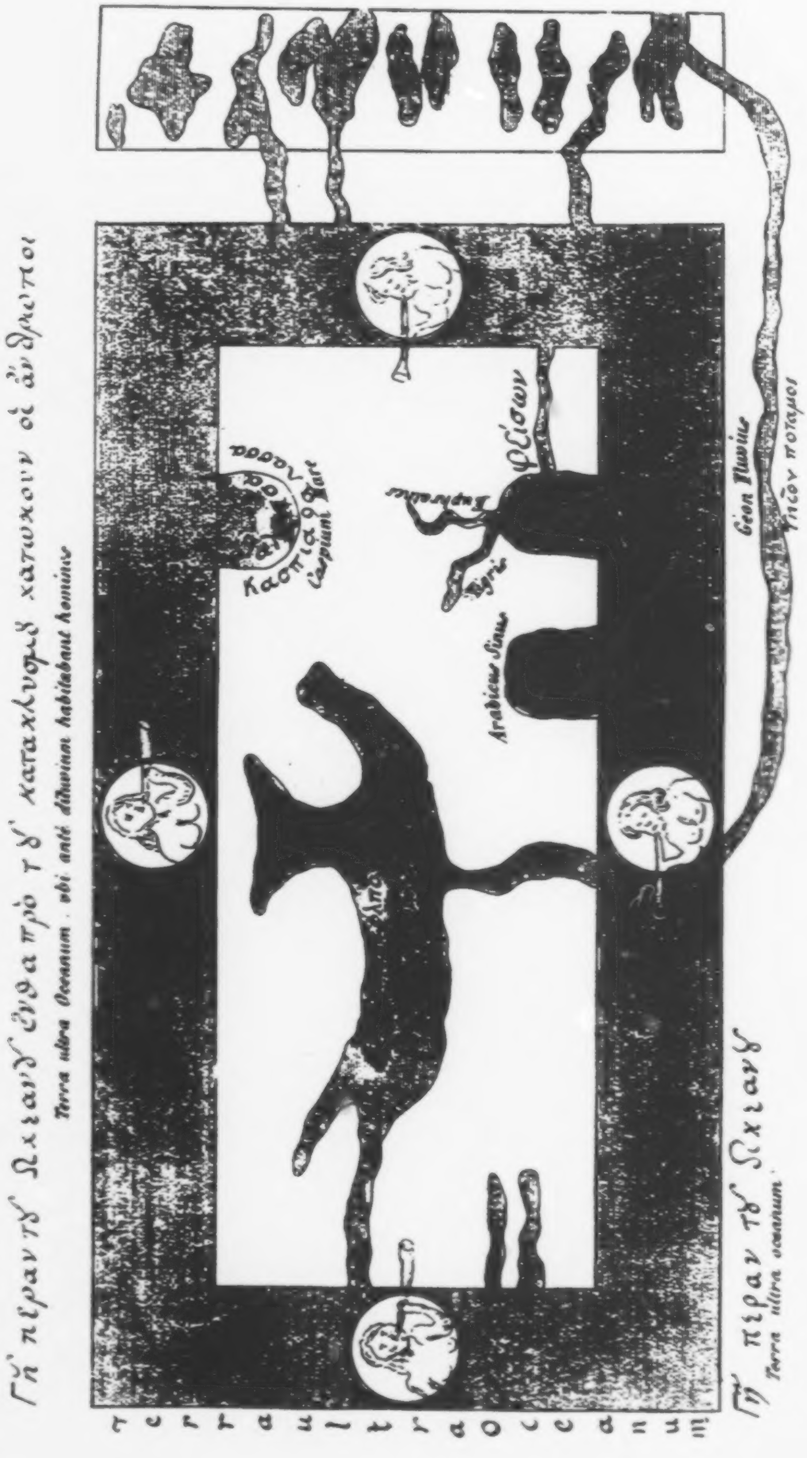
Γῆ πέραν τοῦ Ὠκεανοῦ ἔνθα πρὸ τοῦ κατακλυσμοῦ κατῴκουν οἱ ἄνθρωποι
Terra ultra Oceanum . vbi antè diluuium habitabant homines
terra ultra oceanum
Κασπία θάλασσα
Caspium Mare
Arabicus Sinus
Tigris
Euphrates
Φείσων
Geon Fluvius
Γηῶν ποταμοι
Γῆ πέραν τοῦ Ὠκεανοῦ
Terra ultra oceanum

75

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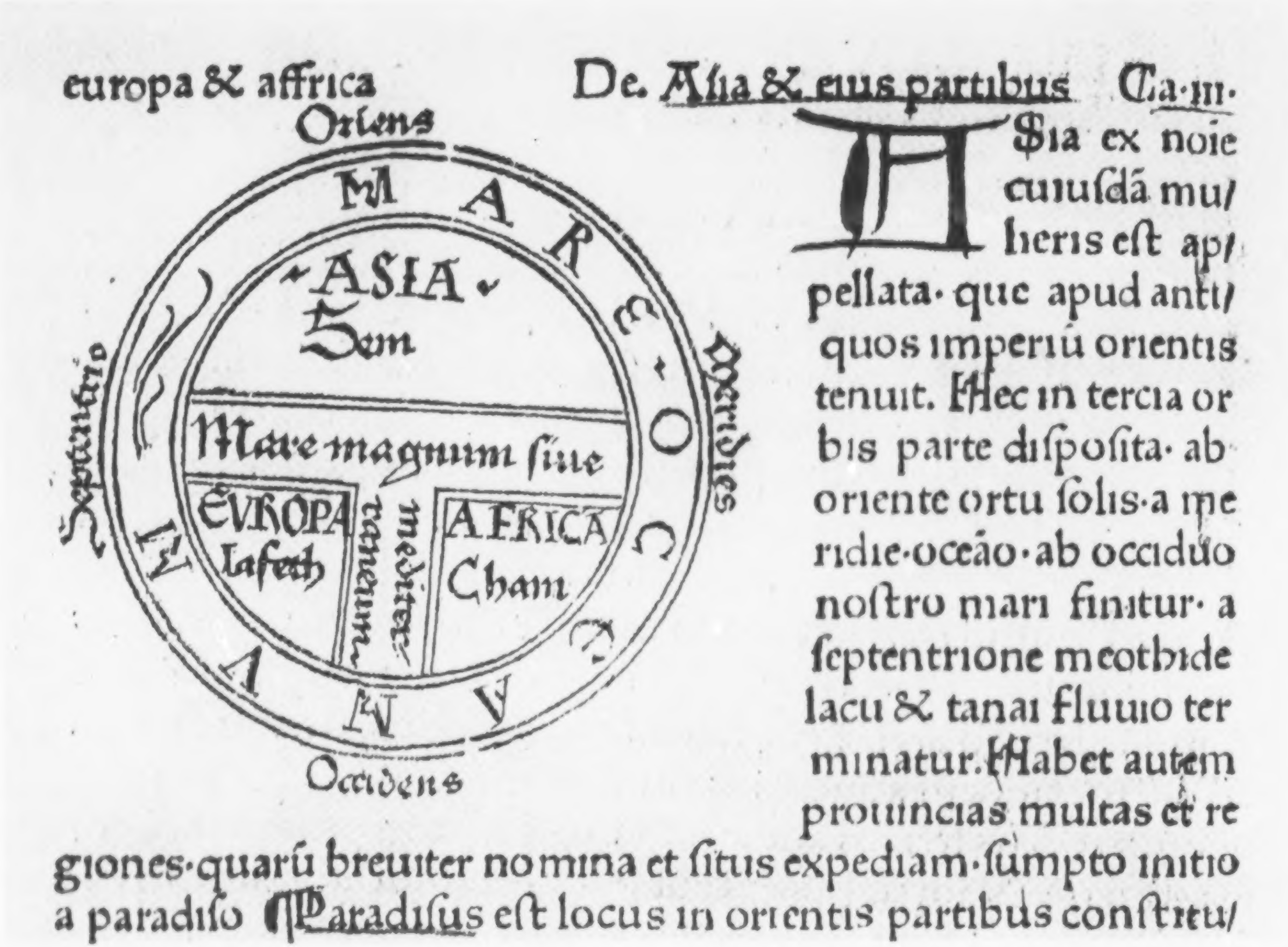

Oriens
MARE OCEANVM
ASIA
Sem
Mare magnum ſiue mediterraneum
EVROPA
Iafeth
AFRICA
Cham
Septentrio
Meridies
Occidens

europa & affrica

De. Aſia & eius partibus Ca·iii·

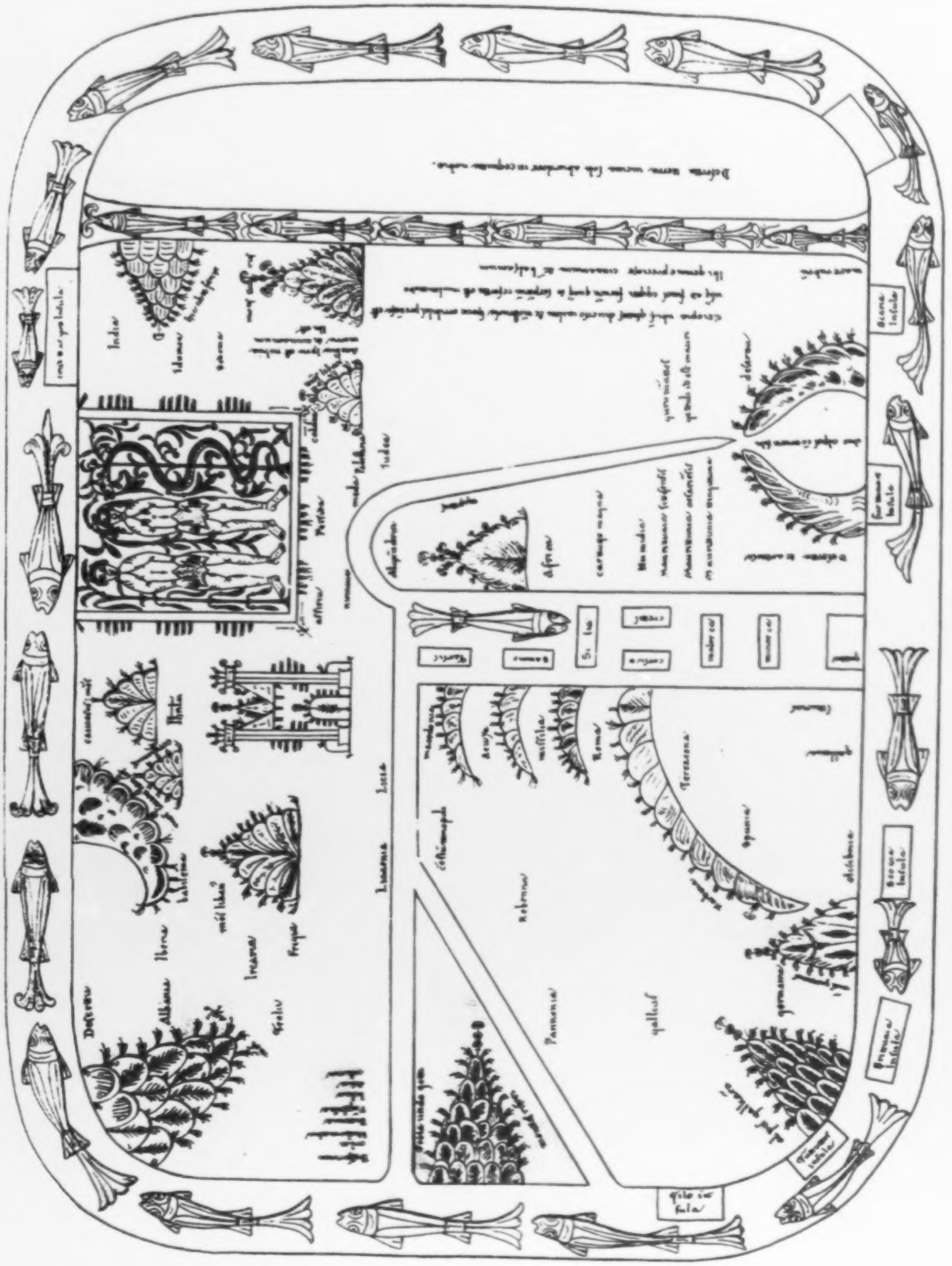
ASia ex noie cuiuſdã mulieris eſt appellata· que apud antiquos imperiũ orientis tenuit. Hec in tercia orbis parte diſpoſita· ab oriente ortu ſolis·a meridie·oceão·ab occiduo noſtro mari finitur· a ſeptentrione meothide lacu & tanai fluuio terminatur. Habet autem prouincias multas et regiones·quarũ breuiter nomina et ſitus expediam·ſumpto initio a paradiſo Paradiſus eſt locus in orientis partibus conſtitu/

Isidore of Seville: A Diagram of the Inhabited World

Figure 8E

Figure 8F

Beatus: The Four Corners of the Earth


Albania
Ibera
babilonia
Ircania
Frigia
Licaonia
Licia
India
Idumea
Iudea
Pannonia
gallia
Roma
Terracona
Spania
germania
Africa
cartago magna

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Al-Idrisi: Map of the World, 1154 A.D. **Figure 8G**

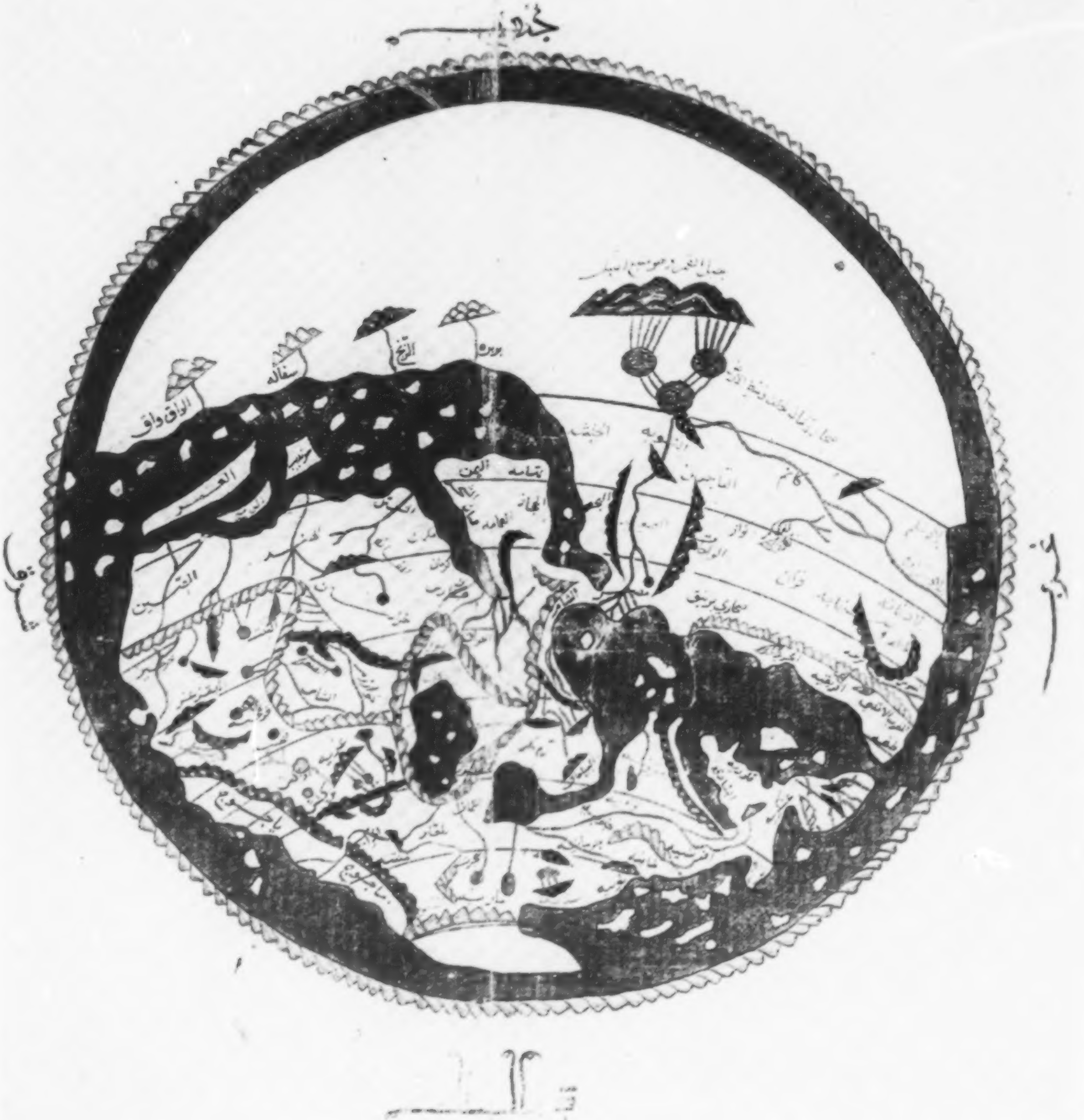

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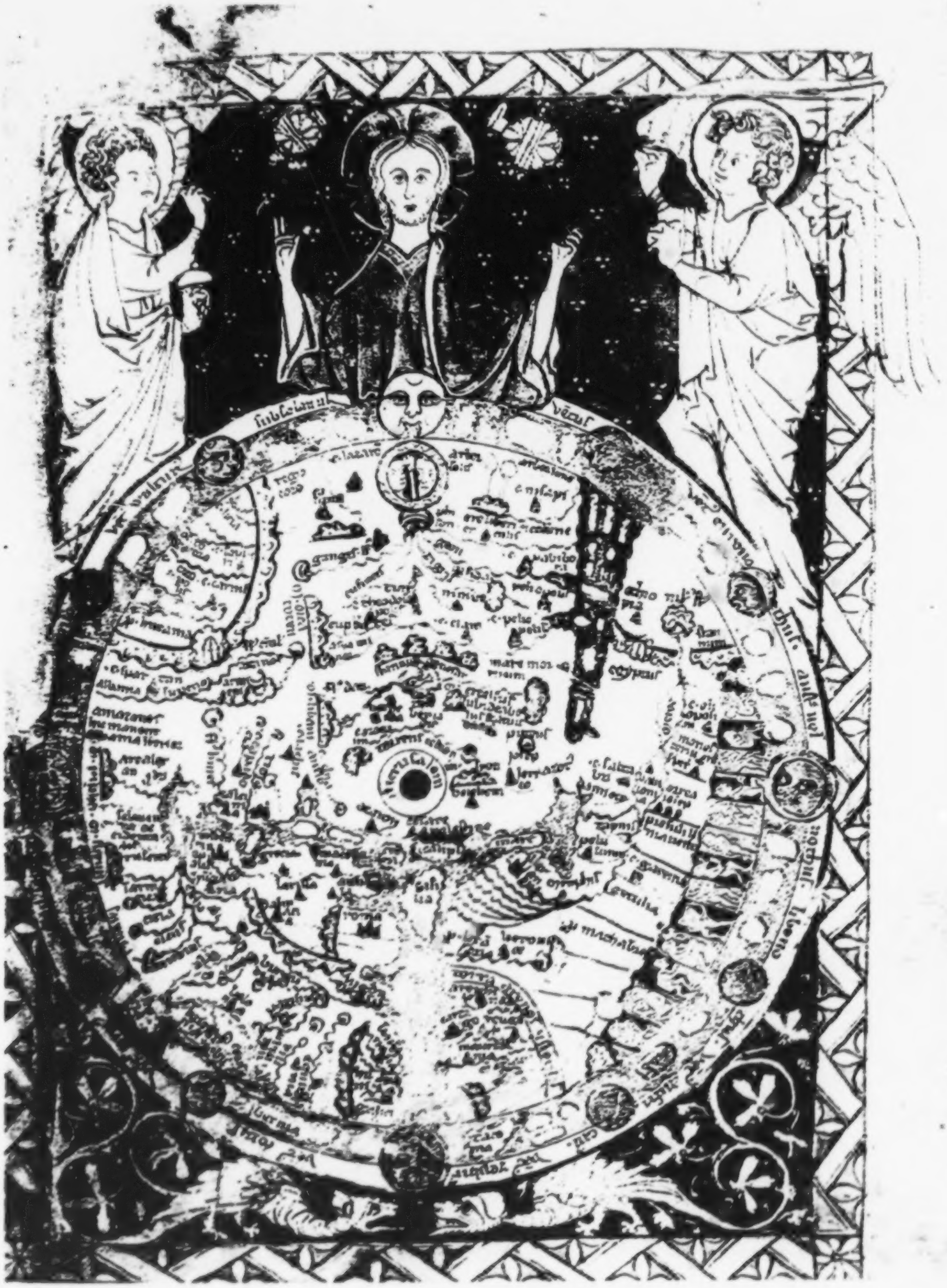
Figure 8H The Psalter World Map, Thirteenth Century A.D.



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A Key to the Hereford Map, Circa 1275 A.D.

Figure 8I

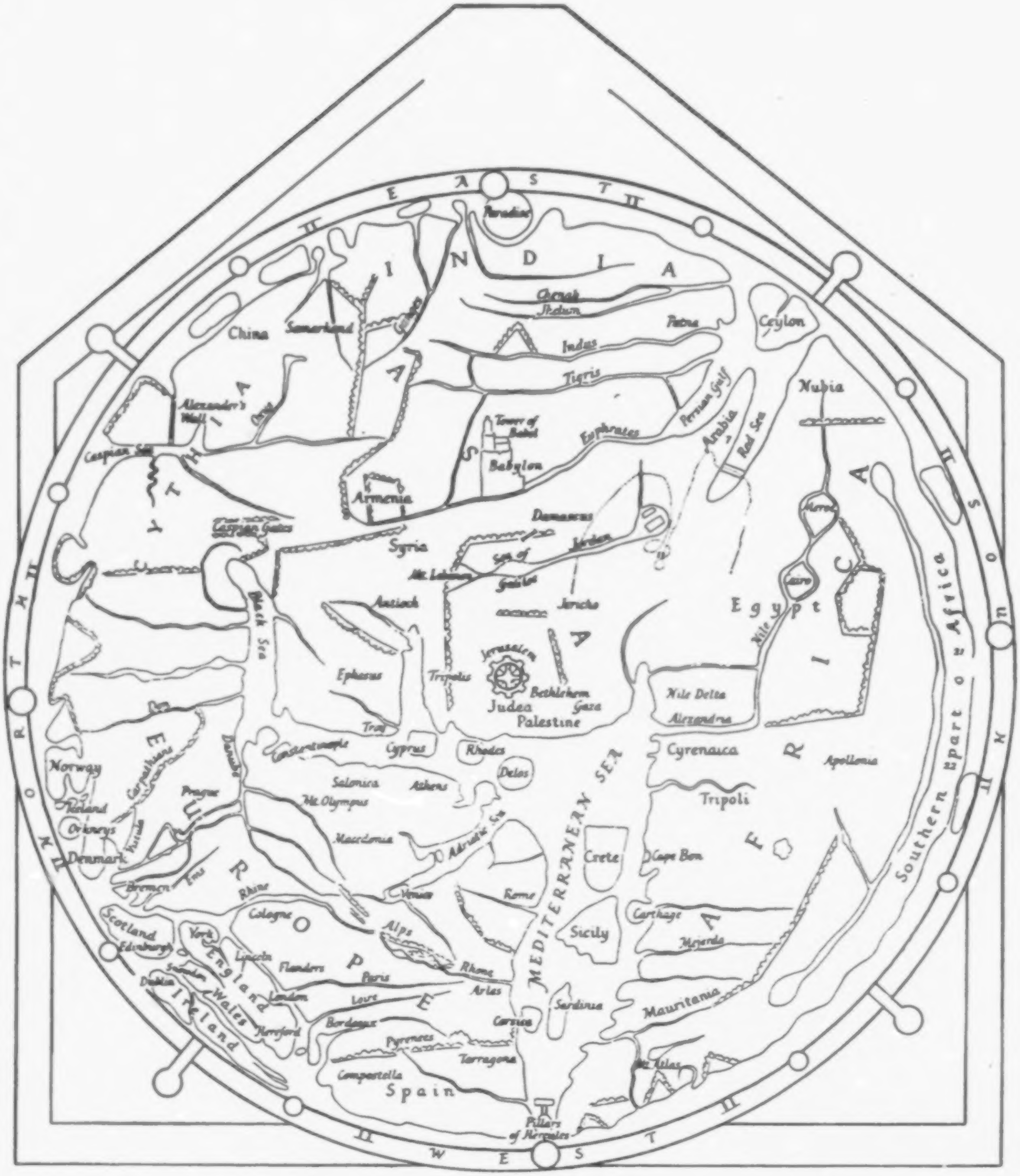
EAST
Paradise
INDIA
China
Samarkand
Ganges
Chenab
Jhelum
Indus
Patna
Ceylon
Tigris
Alexander's Wall
Tower of Babel
Babylon
Euphrates
Persian Gulf
Arabia
Red Sea
Nubia
Caspian Sea
Armenia
Caspian Gates
Damascus
Jordan
Syria
Sea of Galilee
Mt. Lebanon
Antioch
Jericho
Egypt
Meroe
Cairo
Nile
Black Sea
Ephesus
Tripolis
Jerusalem
Bethlehem
Judea
Gaza
Palestine
Nile Delta
Alexandria
Troy
Constantinople
Cyprus
Rhodes
Delos
Cyrenaica
Apollonia
Norway
Carpathians
Danube
Prague
Salonica
Athens
Mt. Olympus
Iceland
Orkneys
Vistula
Denmark
Macedonia
Adriatic Sea
MEDITERRANEAN SEA
Tripoli
Crete
Cape Bon
Bremen
Ems
Rhine
Venice
Rome
Scotland
Edinburgh
York
Cologne
Alps
Sicily
Carthage
Mejerda
Lincoln
Flanders
England
Snowdon
Dublin
Paris
Rhone
Arles
Wales
London
Loire
Ireland
Hereford
Bordeaux
Corsica
Sardinia
Mauritania
Pyrenees
Terragona
Mt. Atlas
Compostella
Spain
Pillars of Hercules
WEST
NORTH
SOUTH
EUROPE
ASIA
AFRICA
Southern part of Africa

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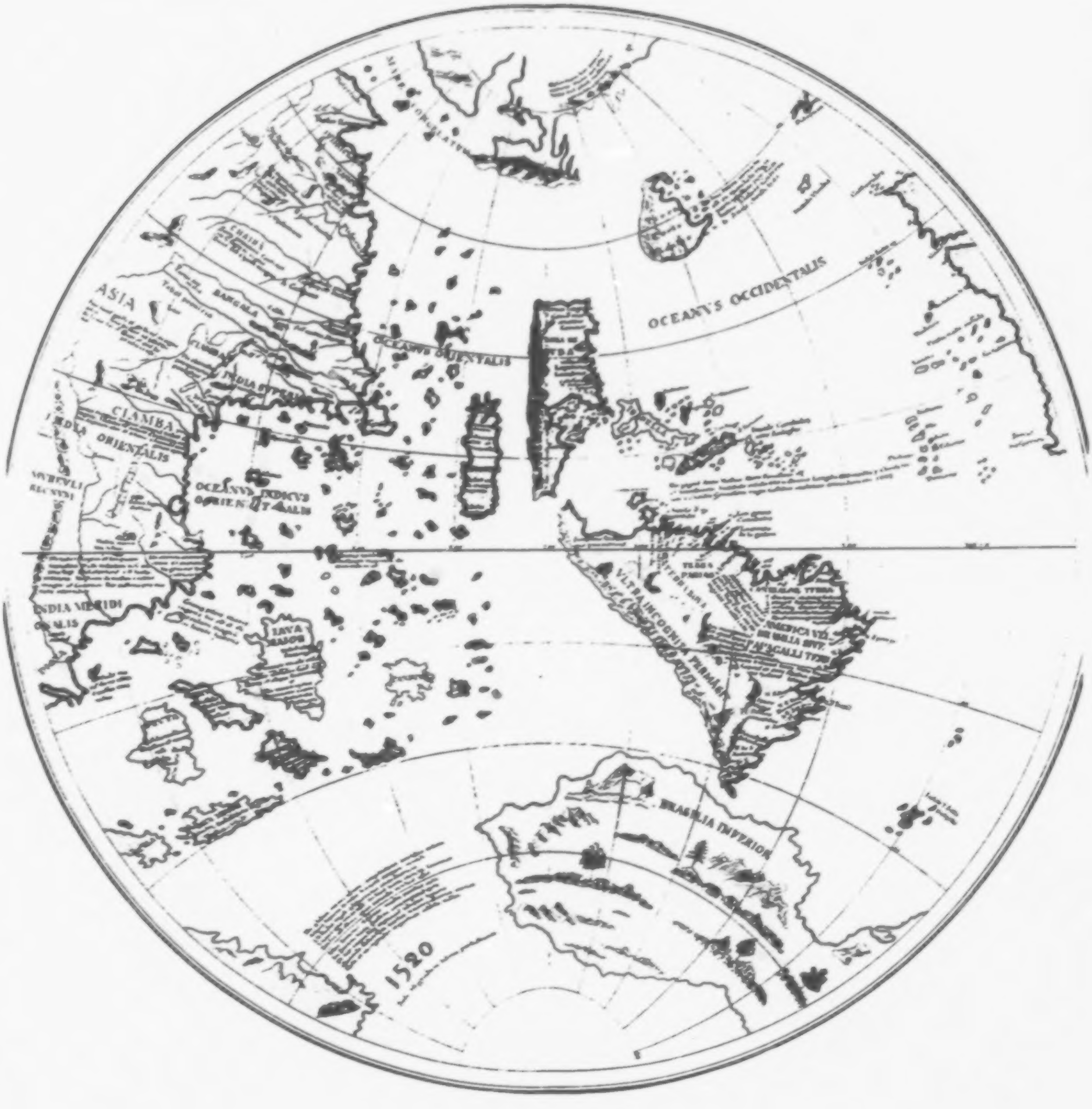
Figure 8J A Globe by Johannes Schöner, 1520


ASIA
CIAMBA
INDIA ORIENTALIS
INDIA SVPERIOR
OCEANVS ORIENTALIS
OCEANVS INDICVS ORIENTALIS
OCEANVS OCCIDENTALIS
INDIA MERIDIONALIS
IAVA MAIOR
VLTRA INCOGNITA
AMERICA VEL BRASILIA SIVE PAPAGALLI TERRA
BRASILIA INFERIOR
1520

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Chapter Nine

Mapping in Grades 5 and 6: Suggestions for a Unit

Roger Anna

I. Objectives:

To give students:

A. an understanding of basic geographic terminology
B. an understanding of what maps are and how to use them
C. the ability to locate their home on local, state, national, continental, and world maps
D. the ability to identify major bodies of land and water, as well as important lines and points on maps
E. the ability to relate other academic areas, specifically math, science, literature, and art, to map reading skills
F. the ability to use a compass and related orienteering skills

II. Unit activities (twelve to fifteen days)

A. What is a map? What is the purpose of maps?
Show students different maps—a floor plan, a weather map, a road map, a battle map, etc.—and discuss the purpose of each one. How are they the same? How are they different? Compare and contrast a globe with a world map. Which one is a better representation of the earth?

Assignment: Draw a map of your route to and from school each day on a transparency with erasable marker.

B. Use an overhead projector to look at students' maps. What did students choose to include or leave out? Which are the best maps? Why? Who included compass directions? Why are they important? Locate the four major directions on a map. On a globe. In space. Pass out compasses. How does a compass work? Compare a compass to a hanging bar magnet at the front of the room. Instruct students how to use a compass to find directions in space.

Assignment: Draw a map of the world on their transparency strictly from memory.

C. (2 days) Show students' world maps to the class and discuss something of interest about each one. Display a printed world map and give each student an index card. Their job is to tell an alien approaching Earth how to find their home city. Collect the cards. Return their maps and an outline map of the world. Could they effectively use their map and their directions to find their home city? Would the outline map be more helpful?

Discuss some important elements of maps and globes. For example: hemispheres, the equator, the Prime Meridian, the International Date Line, time zones, the Tropics of Cancer and Capricorn, the tilt of the Earth, its rotation and revolution, the seasons, and latitude and longitude.

Assignment: Locate the major grid lines on the world outline map and students' home city. Write a description of your city's location based on the most recent discussion.

D. Go over the written assignment. What else might be used to locate your city, for example shapes, landforms and bodies of water? Distribute a set of maps of the world, the Western hemisphere, the North polar projection, North America, the United States, your state, your county, and your city. Locate your city on each map and ask students how they found it.

Assignment: Pass out world maps containing poles, lines, continents, bodies of water and compass rose. Work through the division of Europe and Asia with them. Use the outline map of the world to color the continents different colors and label them in black fine-line marker.

E. Compare the student maps within small groups and spot check them for discrepancies. As a class, develop lists of important identifications on their maps. Begin working on those identifications and labeling them in class. Continue the work in small groups. Make map folders to file maps and use as an atlas for the remainder of the year.

F. Present and discuss time lines. How are they like maps? Put samples of ancient maps on an overhead projector. Discuss what they show and why they were made. (Examples appearing in previous chapters include: Babylonian Map, Figure 2A; Herodotus Map, Figure 2B; Macrobius Map, Figure 3B; T-O Map, Figure 5D.) Compare and contrast each of these to a modern map showing the same approximate region. Where do each of these maps fit on the time line? What else was happening at these times?

Assignment: Give them the Ptolemy map (Figure 2C) and a landsat map. Ask them to use their map folders and label whatever they recognize.

G. Discuss their assignment. Ask who knows what the map is. Where was it taken from? What does it show? Present some examples of different types of maps such as bird's-eye views and floor plans. Why are they maps? Why were they made? What do you use maps for?

Assignment: Bring in a map that you and your family have used. Be prepared to explain how, when, where, and why you used it.

H. Drawing maps. Divide students into groups of four. Using a transparency, draw an aerial outline view of the school building after walking around it. Compare the results on the overhead projector. Do the maps look the same? Why or why not? Why should maps look alike? How could we design the assignment so they would be more similar?

I. Redo the building outlines on graph paper using orientation, measurement, and scale. Compare the results again.

Assignment: Ask students to draw maps of their yards, homes, or kitchens on graph paper. Ask them to include a rough scale (For example, 1 pace = 1/4 inch), a title and a key for symbols. Have a conference with students to discuss changes, corrections, and improvements to be made on their latest maps. Color the maps and matt them for a Learning Center display.

J. Review the organization of their map folders. Review the material covered.

Explain what will be expected of them on the map test.

K. Give the map unit test. Return the test, review it, and respond to students' questions.

III. Cross-curriculum Integration

A. **Math** Do traditional measurement and then geometry units in conjunction with maps.
B. **Science** Do weather and climate units in conjunction with maps.
C. **Literature** Read *Robinson Crusoe* or *Treasure Island* together.
D. **Art** Review elements of design with students, especially the importance of the center.

Chapter Ten

Cities of the World: Cartographic and Historical Perspectives

Charles Hart

Students listen to historical clues in order to locate prominent cities on a world map found in their textbook or classroom atlas. Divide the class into groups of five. Clues are given to a group one at a time in descending order of difficulty. When the group identifies the city and locates it on a world map, the group earns the point value of the last clue.

Shanghai

6. This city founded in the eleventh century did not gain international importance until the British developed it as a port city in the 1840s.

5. This city was sporadically attacked by the Japanese in the 1930s.

4. This city fell to the Japanese in 1941.

3. This city became part of a communist country in 1949.

2. This is the largest city in China.

1. This city's name refers to the practice of drugging and kidnapping someone.

Paris

15. This city was the headquarters of NATO from 1950 to 1967.

14. This city was the site of a peasants' revolt in 1358 called the Jacquerie.

13. This city began as a small Gallic fishing village.

12. This city was burned by the Norse in 845, 856, and 866.

11. In the nineteenth century, Baron Haussman built the boulevards for which this city is famous.

10. This city was the scene of St. Bartholomew's Day Massacre in 1572.

9. In 1200 the university named after this city became the European center of scholasticism.

8. This city was originally concentrated on the Ile de la Cite.

7. This city was conquered by Julius Caesar in 52 B.C.

6. This city became a prominent political center when Hugh Capet began a monarchical line in 987.

5. Nazi commanders ignored Hitler's orders to torch this city when they were forced to retreat.

4. This city was occupied by England from 1419 to 1436.

3. This city is generally thought of as the center of the Enlightenment.

2. This city is located 107 miles from the English Channel.

1. This city was named Lutetia Parisiorum by the Romans.

Jerusalem

13. This city was first mentioned in Egyptian letters dated c. 1370 B.C.E.

12. This city was conquered by Alexander the Great in 332 B.C.E.

11. Romans destroyed this city in 135 A.D., renaming it Aelia Capitolina.

10. This city's inhabitants were enslaved by the Babylonians in 586 B.C.

9. This is the third Holy City of Islam.

8. This city is located 35 miles from the Mediterranean Sea.

7. This was an Arab city from 638 A.D. to 1948.

6. This city contains the Islamic Dome of the Rock Mosque.

5. This city became the capital of the Maccabees' state in the first century A.D.

4. This city was captured by David of the Hebrews c. 1000 B.C.E.

3. Solomon built the first Temple here in 970.

2. This city contains the Wailing Wall.

1. This city is the current capital of Israel.

Vienna

14. This city was originally a Celtic community.

13. This city was called Vindobena when it was a Roman military settlement.

12. This city at one time was the home of Marcus Aurelius.

11. This city was destroyed by Attila in the fifth century.

10. This city was ravaged by a plague in 1679.

9. This city was occupied by the French in 1805 and 1809.

8. This was the first city in the world to initiate a housing program for workers.

7. This city was the home of Sigmund Freud, Gustav Mahler, Johannes Brahms, and Richard Strauss.

6. This city was the former capital of the Holy Roman Empire.

5. This city is located on the River Danube.

4. This city was unsuccessfully besieged by the Ottoman Turks in 1529 and 1683.

3. This city was the home of Mozart, Beethoven, Haydn, and Schubert.

2. This city was the site of a Congress in 1815 that determined the post-Napoleonic political delineation of Europe.

1. This city became the capital of Austria in 1156.

Moscow

6. This city was stormed by Tatars in 1237 and 1382.

5. This city was declared a Grand Duchy by Ivan III.

4. This city's leader, Sozdal, built a wooden Kremlin there in 1156.

3. This city was torched by Napoleon in 1812.

2. The center of this city is the Red Square.

1. This city is located on the Moskua River.

St. Petersburg

9. This city contains the Hermitage.

8. Land upon which this city is located became part of Russia as a result of the Great Northern War, 1700-1721.

7. This city was the scene of the Decembrist Revolt of 1905.

6. This city successfully resisted a 900-day siege by Germans during World War II.

5. This city was designed by its founder to be a "window looking on Europe."

4. This city is also called Petrograd.

3. This city became the capital of Russia in 1712.

2. This city was founded by Peter the Great.

1. This city was once called Leningrad.

Tokyo

6. Today, this is one of the largest cities in the world.

5. In 1923, this city was badly damaged by an earthquake.

4. This capital city was called Edo in the twelfth century.

3. Emperor Meiji renamed the city in 1868.

2. This city was controlled by Ieyasu Tokugawa, founder of a line of shoguns that ruled the country for almost 300 years.

1. This city's famous shopping region is called the Ginza.

Baghdad

8. In 762, this city became the capital of the Abbasid Empire.

7. In the year 800, this city had a population near two million.

6. This city was ransacked by a grandson of Genghiz Khan in 1258.

5. This city was conquered by Tamerlane in 1401.

4. This city was captured by Suleiman The Magnificent in 1534.
3. This city was captured by the British in 1917.
2. This city is located on the Tigris River.
1. This city is the capital of Iraq.

Singapore

8. This city was destroyed by the Japanese in 1365.
7. This city was renamed Shonan by the Japanese.
6. Today, this city possesses the second busiest seaport in the world.
5. This city was refounded by Sir Thomas Raffles of Britain in 1819.
4. This city was defeated by the Japanese on February 15, 1942.
3. From 1963-1965 this city was part of Malaysia.
2. This city is located on the southern tip of the Malaysian peninsula.
1. This city was named City of Singhs by a ruler from Pelambang.

Rio de Janeiro

6. This city's harbor was first seen by Europeans in 1502.
5. French Huguenots established a colony here in 1555.
4. This city is nestled in Guanabara Bay.
3. This city is the site of Sugar Loaf Mountain.
2. This city is the site of Copacabana Beach.
1. This city became the capital of the colony of Brazil in 1763.

Cairo

6. This city was considered an important medieval stop on the east-west trade route.
5. This city fell to the Turks in 1517.
4. This city was constructed in the tenth century as a Muslim capital.

3. This city was occupied by the British forces in 1882.
2. This city was located near ancient Memphis.
1. This city was the site of the ancient ruins of Sagghara and Gizeh.

Mecca

8. This city was sacked by the Karmathians in the tenth century.
7. This city was seized by Mehmet Ali of Egypt in the early nineteenth century.
6. This city came under the control of Ottoman Turks in 1517.
5. This city became the capital of the Kingdom of Hejaz in 1916.
4. This city is the site of the Great Mosque.
3. This city is the site of the Kaaba.
2. This city was the birthplace of Mohammed the Prophet.
1. This city is the destination of Islamic pilgrimages.

Delhi

10. This city is located on the Jurana River.
9. This city was seized in 1398 by Tamerlane.
8. This city was the site of the Peacock Throne from 1638-1739.
7. Babur conquered this region in 1526 at the Battle of Pampat, which led to the creation of the Mogul Empire.
6. This city was the site of the crownings of Victoria, Edward VII, and George V, rulers of India.
5. This city contains the Red Fort built by Shah Jahan.
4. This city was built on the ruins of Indraprastha.
3. This city was home of the Great Mosque by Shah Jahan.
2. This city replaced Calcutta as the capital of British India from 1712-1931.
1. This city became the capital of independent India in 1947.

Constantinople

10. This city was founded in 667 B.C. by Greeks from Megara.

9. This city is located on a peninsula called the Golden Horn.

8. This city is located alongside the Bosphorus.

7. This city was captured and sacked by western Europeans during the fourth crusade in 1204.

6. The Roman capital moved here in 324.

5. During most of the Middle Ages, this city was considered a repository of ancient Western knowledge.

4. This city fell to invading Turks in 1453.

3. This city is home to the Eastern Orthodox Christian faith.

2. This city was the capital of the Byzantine Empire.

1. This city's modern name is Istanbul.

London

13. This city was devastated by a plague in 1665.

12. In 1381, Wat Tyler led a peasants' revolt here.

11. Queen Boudicca burned this city in 60 A.D.

10. This city contains the first stone bridge since Roman times to cross a major river.

9. This city was a Celtic hamlet until it was invaded by Emperor Claudius in 43 A.D.

8. This city was devastated by the Great Fire of 1666.

7. This is the largest city in Europe today.

6. Sir Christopher Wren built many natural wonders here.

5. Charles Dickens decried the poverty of this city's East End in many of his books.

4. This city is located on the Thames River.

3. William the Conqueror built his White Tower here after his victory at the Battle of Hastings.

2. This city was the starting point for Chaucer's pilgrims in *Canterbury Tales.*

1. The plays of Marlowe, Johnson, and Shakespeare were all first performed here.

Madrid

5. This city is located on the Manzanares River.

4. This city was originally a Moorish castle.

3. The Prado Museum is in this city.

2. This city was made the capital of its nation by Philip II in 1561.

1. This city is the current capital of Spain.

Rome

10. This city began its history as an Etruscan city.

9. This city was sacked by Normans in 1084.

8. The famous Carthaginian general, Hannibal, laid siege to this city.

7. Charlemagne was crowned emperor in this city in 800.

6. Legend has this city founded in 753 B.C.

5. This city became a world class trade center after defeating the Carthaginians in the third Punic War in 146 B.C.

4. This city is located on the Tiber River.

3. This city has an independent country located in its environs.

2. By the 16th century, this city was known as the Catholic center of Europe.

1. According to legend, this city was founded by Romulus.

Florence

7. In the twelfth century the Guelphs and Ghibellines fought over this city.

6. Savonarola created a theocracy here in the end of the fifteenth century.

5. The Baptistry was used to develop the artistic concept of perspective.

4. The Uffizi Gallery is in this city.

3. This city was the home of Alberti, Brunelleschi, and Ghiberti.

2. This city is located on the Arno River.

1. By the fifteenth century, this city was controlled by the Medici family.

Bejing

8. This city was the capital of the Yen Kingdom before the birth of Christ.

7. This city was the site of the Boxer Rebellion.

6. This city was Kublai Khan's capital city.

5. This city was the focal point of the cultural revolution in the 1960s and 1970s.

4. Marco Polo stayed here much of the time while in Asia.

3. This was the host city for the 1972 summit meeting between Richard Nixon and Mao Zedong.

2. The Forbidden City is located within this city.

1. This city is the capital of the Peoples Republic of China.

Mexico City

5. This city was the site of Emperor Maximilian's coronation in 1864.

4. This city was captured by United States forces under General Winfield Scott in 1847.

3. This city was the capital of New Spain for 300 years.

2. This city was built on the ancient Aztec capital, Tenochtitlan.

1. This city is the current capital of Mexico.

New York City

8. Giovanni da Verrazano was the first European to visit this site.
7. This city was the scene of bloody draft riots from July 13-16, 1863.
6. This city was the Eastern terminus of the Erie Canal.
5. Henry Hudson sailed up the river named after him from here in 1609.
4. This city was home to Tammany Hall and the Tweed Ring.
3. This city was our nation's first capitol.
2. When controlled by the Dutch, this city was called New Amsterdam.
1. This city is the current headquarters of the United Nations.

Athens

11. The Delian League was created here.
10. Port city is Piraeus on the Aegean Sea.
9. Solon created a limited democracy here by granting people with property the right to vote.
8. Pericles built the city as we remember it.
7. This city was sacked by Xerxes in 480 B.C.
6. This city is located on the plain of Attila.
5. The Peloponnesian Wars ended this city's Golden Age.
4. This city was home to Aeschylus, Aristophanes, Sophocles, and Euripides.
3. This city was Sparta's chief rival.
2. This city's fortified citadel, the Acropolis, dates from 1200 B.C.
1. This city is the modern capital of Greece.

Warsaw

6. This city was developed after the Duke of Masovia built a thirteenth-century castle here.

5. This city was the site of revolts against Russia in 1830 and 1863.
4. German troops occupied this city in 1915 and again in 1939-1945.
3. This city is located on the Vistula River.
2. This city was a center for labor activism in Eastern Europe in the 1980s.
1. In 1596 this city replaced Cracow as Poland's capital.

Jakarta

6. This city was founded by The Dutch in 1619.
5. This city was the headquarters of the Dutch East India Company.
4. The Japanese controlled this city during World War II.
3. This city's colonial name was Batavia until it was renamed in 1949.
2. Today, this city is one of the 10 largest cities in the world.
1. This city is the capital of and largest city in Indonesia.

Amsterdam

8. This city was controlled by Spain in the sixteenth century.
7. This city became a member of the Hanseatic League in 1369.
6. This city was the capital of the Batavian Republic in 1795.
5. This city was occupied by Germany from 1940 to 1945.
4. This city is near the North Sea.
3. This city was a flourishing commercial center in northern Europe in the seventeenth century.
2. This is the largest city in the Netherlands.
1. This city is the capital of the Netherlands.

Chapter Eleven

The World in our City: Ethnicity in Chicago

Margaret Kania

Chicago is a city of many ethnic neighborhoods created by immigration. Students' own family stories and an in-depth study of their own neighborhoods can enhance their understanding of how immigration shaped Chicago.

These lesson plans are intended for sixth-, seventh-, and eighth-grade bilingual classrooms as an introduction to a year-long study of Chicago and its ethnic neighborhoods.

Lesson One

Objectives

Students will:

1. enumerate some ethnic groups found in Chicago
2. discuss emigrants' migratory paths and modes of transport
3. locate immigrants' countries of origin on a map.

Materials

world map, round stickers

Lesson

1. Each student will write down five ethnic groups living in Chicago.
2. Compile the students' lists on a large sheet of paper in front of the class.
3. Together, name the place of origin for each group.
4. Ask students to place a round sticker on each country or area on the world map.
5. Discuss how these immigrants might have traveled to Chicago.
6. Ask students to trace on a world map the possible routes of five ethnic groups from their place of origin to Chicago.

Lesson Two

Objectives

Students will:

1. discuss the major reasons why people emigrate
2. read an article on immigration
3. describe the experiences of a typical immigrant family in small groups.

Materials

1. Recent articles of relevance collected by the teacher, or
2. Hilda Satt Polacheck, "I Came a Stranger," Chicago Neighborhood History Project. (available from the Chicago Metro History Fair, Newberry Library).

Lesson

1. Review the previous lesson.
2. Ask students, in small groups, to discuss the reasons people immigrate.
3. Share the groups' ideas with the entire class.
4. Ask each student to read an article and discuss the articles in small groups.
5. As a class, discuss whether the articles confirm or modify any of the ideas expressed about the reasons for immigration at the beginning of this lesson.
6. In small groups ask students to pretend they are an immigrant family. Explain where the family was from, their reasons for leaving, why they chose Chicago as their destination and what it was like for them when they arrived.
7. Ask if any of the groups' imaginary experiences are similar to any student's own family's immigration experience.

Ask students to prepare a map showing their family's place and/or city of origin, their route to Chicago and a story about their family's immigration experience. If such information is not applicable or available, students may interview a friend, relative, or neighbor to obtain the pertinent information.

Lesson Three

Objectives

Students will:

1. describe their family's immigration experience
2. compile classroom information on a map
3. use their family's experience to better understand immigration.

Lesson

1. Students will show their maps from lesson two to the class, explain their family's place of origin and relate their family's immigration story.
2. The class will ask questions at the end of each student report.
3. Students should note from the questions what vital information may have been left out of their presentation.
4. After all students have spoken, ask the class to compare and contrast the experiences. Do any patterns seem to emerge?
5. Students will work on compiling the information from individual maps onto one classroom map showing the origins of all students' families.
6. Ask students to rewrite their immigration stories to include important missing information and perhaps to compare their individual experiences to the general pattern.

Lesson Four

Objectives

Students will:

1. explain the title of the report, "Forty-four Cities in the City of Chicago"
2. name some Chicago neighborhoods
3. locate some Chicago neighborhoods on a map
4. discuss the contributions their ancestral culture has made to Chicago

Materials

1. A copy of the cover from the Chicago Plan Commission report "Forty-four Cities in the City of Chicago" (Figure 11A)
2. A street map of Chicago

Lesson

1. Hand out copies of the cover of the report "Forty-four Cities in the City of Chicago" to students. Discuss reasons for the title.
2. Discuss what factors distinguish one neighborhood from another.
3. Describe signs of the city's heritage—street names, architecture, stores, languages, people, restaurants, etc.
4. Ask students to list what their culture has contributed to the city.
5. Ask students to discuss Chicago's ethnic neighborhoods.
6. Write some neighborhood names on large chart paper.
7. Locate the neighborhoods on a large Chicago map.
8. Ask students to design a map of Chicago that highlights five ethnic neighborhoods and a major ethnic group that lives in each one.

During the year students will take an in-depth look at their own neighborhood as well as other ethnic neighborhoods of their choice. Trips to these neighborhoods and scavenger hunts might serve as major organizing activities. Students should always record the information they have gathered in a Chicago notebook which would include maps and views of the city.

A Day in the Neighborhood
Pilsen Scavenger Hunt

Directions

As you walk through the area use all your senses to learn about the people who live and work and play here. Interview at least one person and try to learn at least one new thing in each store or business you enter. Use this sheet to record your findings.

1. Sketch a neighborhood mural on the reverse side of this sheet. Label the people in the mural and/or identify themes you see.
2. Find out who La Decima Musa is and write about her here.
3. List some differences between Mayan food and the Mexican food you have eaten in the past.
4. Identify at least three nonfood items of Mexican character you find in a grocery store. List them or sketch them here.
5. List three titles of magazines or newspapers available in the neighborhood.
6. Who lives here now? What ethnic groups lived here before? What clues exist in the neighborhood which lead you to this conclusion?
7. List 10 services available in the neighborhood. Are any usual neighborhood services missing?
8. Find five Spanish/English cognates (like frutas, words that are similar in both Spanish and English). List them here.
9. Find five words (not cognates) in Spanish and guess their meaning from their context. (e.g., "pan" (bread) in a bakery). List them here.
10. If you speak Spanish find three words new to you and list them along with their meanings.

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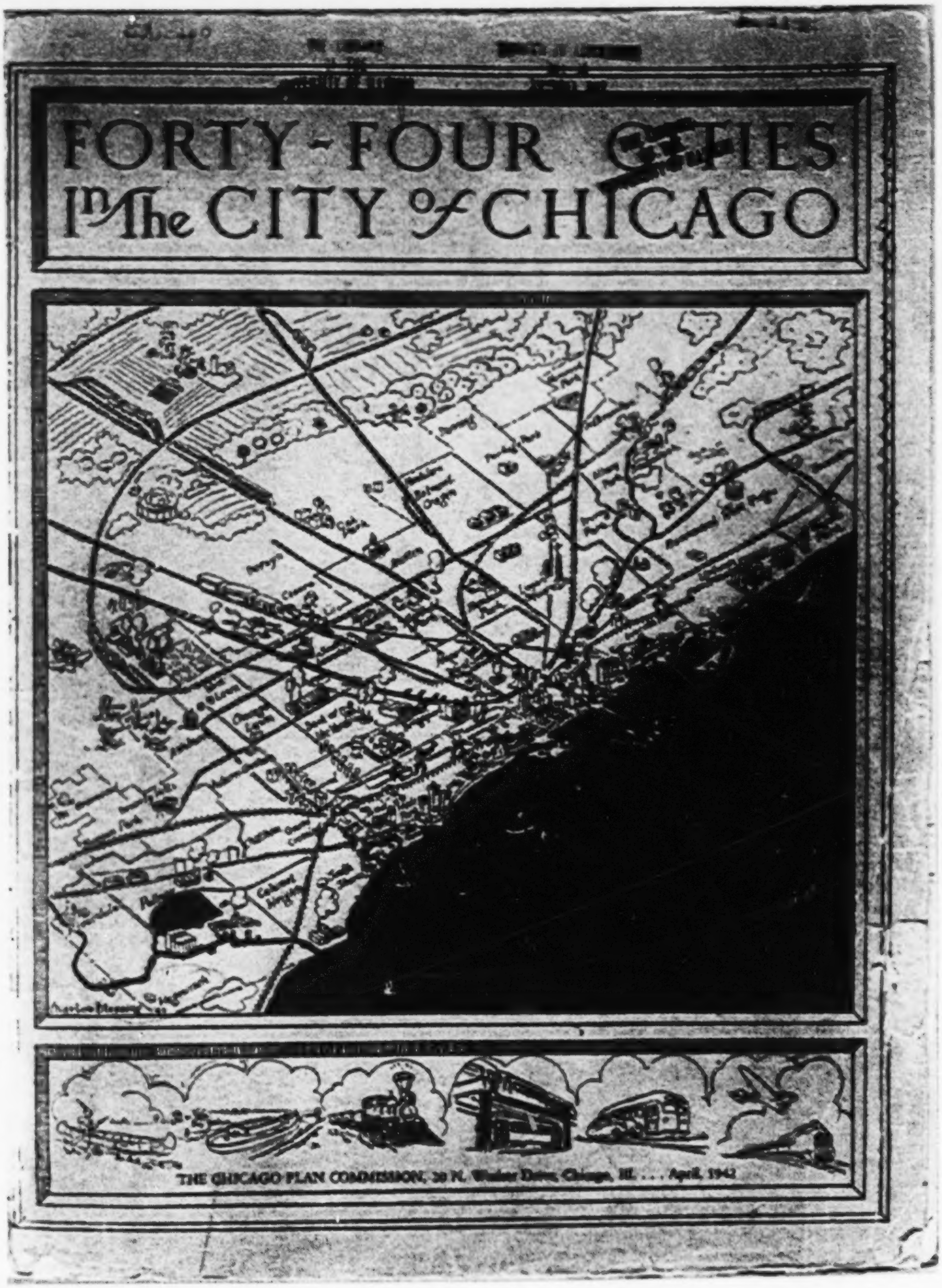
Figure 11A **Cover of the Chicago Plan Commission Report "Forty-four Cities in the City of Chicago"**



FORTY-FOUR CITIES
In The CITY of CHICAGO

THE CHICAGO PLAN COMMISSION, 20 N. Wacker Drive, Chicago, Ill. . . . April, 1942

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Chapter Twelve

The History of Cicero Township: Cartographic Perspectives

Charles E. Samec

Introduction

The land changes constantly. When glaciers covered North America and then slowly retreated, they deposited rich soils, produced hills and indentations in the land, and created lakes, rivers and streams. This chapter will investigate how a small area of Illinois between the Chicago River and the DesPlaines River was transformed, not by natural means, but by human activities. Here the Indians portaged their canoes and the French envisioned a link between Lake Michigan and the Illinois River. It was, in other words, a place people crossed to go somewhere else.

Why did people stay and change a wilderness? In order to discover how this area was dramatically transformed, a sequence of old maps will be considered. The first one is from the General Land Office (GLO) (Figure 12A). The Land Ordinance of 1785 established a system of land division under which all of the Old Northwest was surveyed. As a result, a checker-board pattern of townships, each approximately six miles square, appeared on maps produced by the surveyors. In 1812, Congress created the General Land Office, giving it the duty of overseeing land transactions. The GLO used the results of the earlier surveys to accurately record land transactions.

As Illinois was surveyed in accordance with the 1785 land act as amended over the years, a base line, running east and west, was drawn across the southern third of the state. The third principal meridian, running north and south, cut the state almost in half. Most Illinois townships are numbered north or south of the base line and are also designated as east or west of the meridian. Cicero Township is Township 39 north of the base line and range 13 east of the third principal meridian. The township contains 36 sections, each containing approximately 640 acres (1 square mile).

Various types of maps are also used in this survey. Cadastral maps, which record land ownership, are shown in Figures 12B, 12C, and 12D. Figure 12E is a state atlas map. Unlike the cadastral maps, this map shows no evidence of land ownership. Instead, it gives us a picture of the area in 1876, showing general cultural features.

Beginning in the 1880s, the United States Geological Survey (USGS) produced a series of large-scale maps of the United States done in individual parts called quadrangles. These show the contours of the land and also provide us with detailed cultural information. USGS quadrangles are used for Figures 12F, 12G, and 12H.

This chapter focuses on the area designated Berwyn and Cicero, specifically on the development of the six sections located in the southwestern corner of Cicero Township. In the pages that follow, eight maps are discussed. Each map portrays six square miles of the township. Another series of parallel maps that consider the six adjacent sections to the east are on file at the University of Illinois at Chicago. This method was chosen in order to trace the histories of both Cicero and Berwyn because it is difficult to talk about the development of one community without the other.

General Land Office Survey Map, 1831 (Figure 12A)

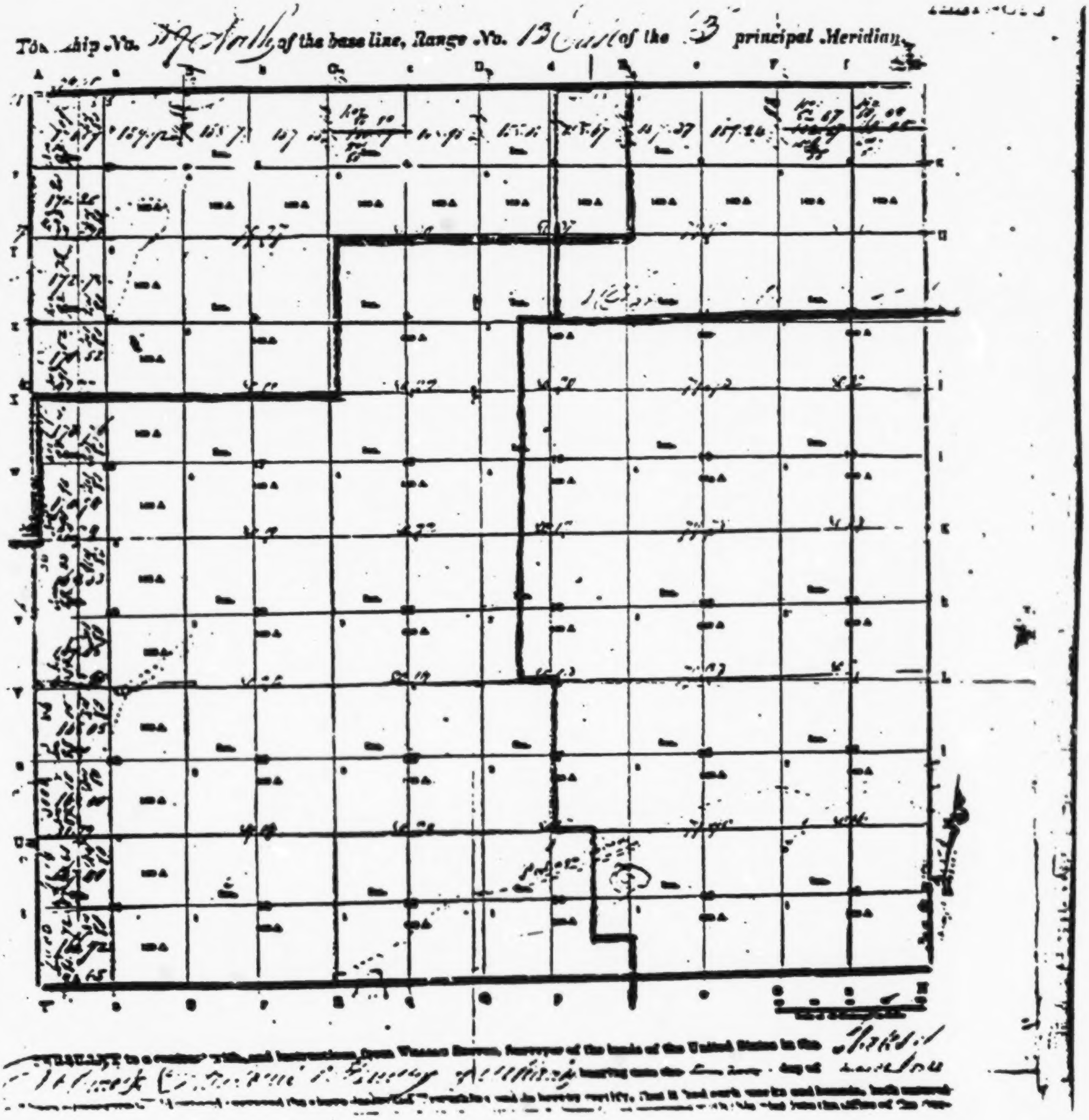
While surveying the township, surveyors kept field notes and later used these to draw three copies of a township plat. One copy of the plat and the original field notes were kept by the Surveyor General's Office; a second plat and transcriptions of the field notes went to the General Land Office; and a third copy of the plat was used by the local land office to record land transactions.

The plat on the opposite page comes from a microfiche copy of the Illinois State plat and shows the section and half-section lines of the township. Most of the sections in the township are one mile square, containing 640 acres. However, those at the north and west edges are slightly smaller — section 1 contains 643.12 acres, while section 5 has only 636.05 acres. Western sections are slightly larger from section 31 in the south to section 6 in the north. Section 31 contains 654.13 acres, and each succeeding section is progressively larger, with section six the largest at 667.21 acres. Thus Cicero Township is not exactly six miles square.

Note there are wooded areas in four of the sections—6, 7, 19, and 30. Also, a portage route runs across the southern half of the township connecting the south branch of the Chicago River with the DesPlaines River. Beyond this trail, the map shows no Indian nor European cultural features.

General Land Office Survey Map, 1831

Figure 12A


Township No. 39 North of the base line, Range No. 13 East of the 3 principal Meridian
of the lands of the United States in the
day of

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James H. Rees Map of the Counties of Cook and Dupage and the East Part of Kane and Kendall and Northern Part of Will Counties, 1851 (Figure 12B)

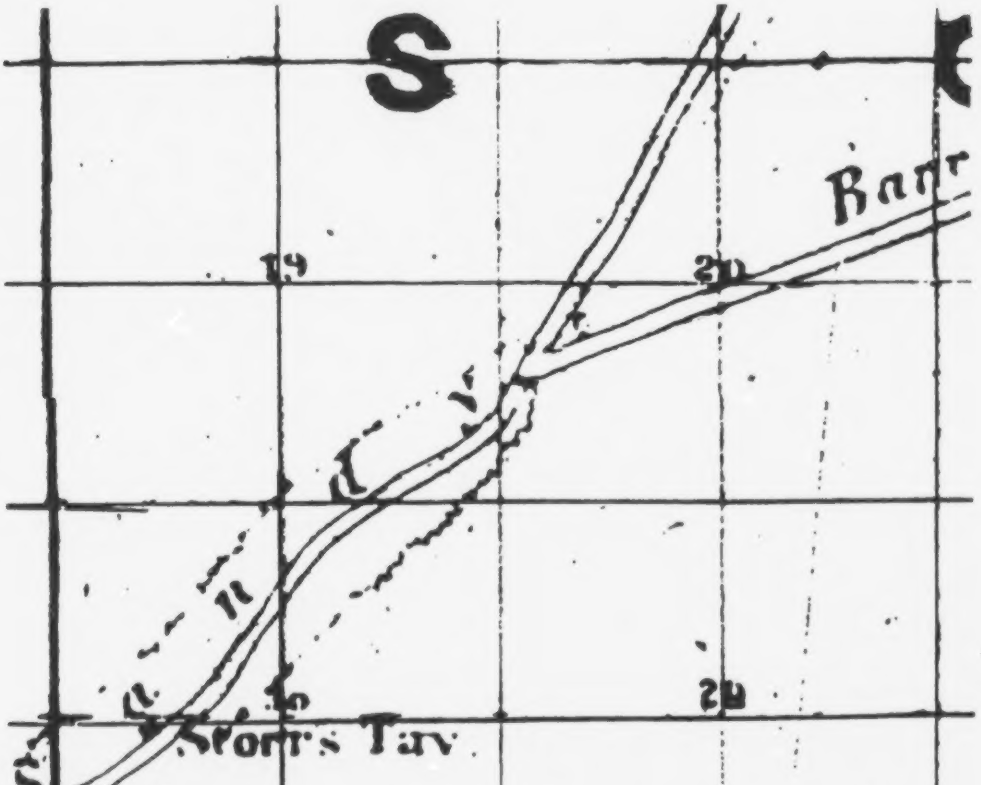
Proviso Township, created in 1850, included the western portion of what would become Cicero Township. The eastern half was then part of the Township of West Chicago. The Rees Map indicates that Proviso had a population of 482. Note the natural features that appear on this map: a sandy ridge, wooded areas, and wetlands in the southeast corner of section 32.

In 1827 Congress granted alternate sections of some public lands to the state of Illinois to fund a canal which would connect the Chicago and Illinois River systems. The land was granted for five miles on each side of the canal right-of-way. The state was authorized to sell or lease these lands in order to construct the canal. After a long struggle of over 20 years, the Illinois and Michigan Canal was finally in operation in 1848.

On November 4, 1847, Theodorus Doty obtained a strip of land 80 feet wide from the Canal Company to construct the Southwest Plank Road. The site chosen because the plank road was an old Indian trail, known alternately as Brush Trail or Fullersburg Trail. Constructed between 1848 and 1850, the plank road ran the length of the township, paralleling the canal. Ultimately, people were able to journey from Chicago to Naperville in relative comfort. The Southwest Plank Road was the first of several plank roads built during this period.

Also note the road system in sections 20 and 21. The first road, Riverside Road, runs diagonally from the southwest to the northeast. Barry's Point Road turns east to present-day Lake Street (labeled Elgin Road elsewhere on the map). A third road splits off and travels in a northerly direction across section 20 in the direction of Green Bay, Wisconsin. This was called Austin Ridge Road. Note that the two taverns servicing these roads are in the grove of trees along the sandy ridge.

James H. Rees Map, 1851 **Figure 12B**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Storr's Tav.
Kellogg's Tav.
31
32
P
A

James H. Flower Map of Cook County, Illinois, 1861 (Figure 12C)

In 1860, the newly created Cicero Township had a population of 1,272. William Butler Ogden, the first mayor of Chicago, had a profound influence on the development of the new township. His leadership led to a railroad being constructed across the northern part of the township in 1849, which led to the rapid development of these areas, later called Oak Park and Austin.

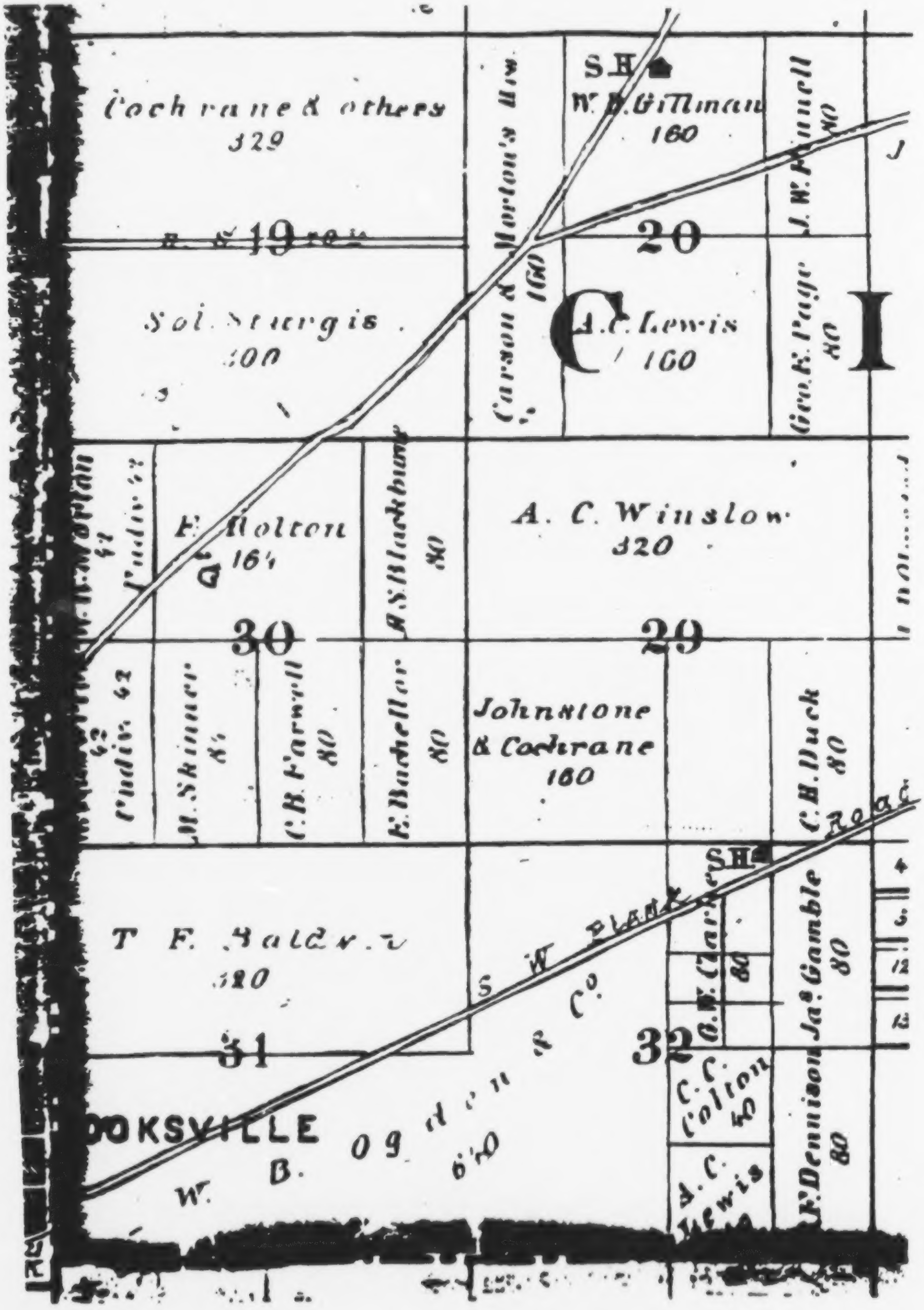
In 1848 the Illinois and Michigan Canal was also in operation. Although it was located south of the township it nevertheless had an important effect on the development of its southern sections. Ogden owned a lot of land throughout the township, especially in sections 31 and 32, where he hoped to house those who had worked on the canal. While many of the former canal workers lived in Bridgeport, some did choose houses in the less expensive, but marshy lands of Cicero Township.

The area was made habitable by the creation of ditches on the section lines, and, later, on the half-section lines that drained the water southward. The drainage ditches measured 12 feet wide at the top, 2.5 feet wide at the bottom, and 4 feet deep. A. T. Andreas writes in *The History of Cook County, Illinois,* "The effect [of the drainage ditches] has been the same as if the whole township had been elevated as many feet above the previous water level, the ditches having caused the water to settle below that level". (p. 774). Later, in 1871, Ogden would cut a path from the west fork of the Chicago River to the DesPlaines River (labeled "Ogden's Ditch" on some of the maps), to drain water westward.

Two new cultural activities are shown on this map. In section 32, the LaVergne School, the first school built in the southern part of the township, is located at the Southwest Plank Road. A second school is located in section 20.

James H. Flower Map, 1861

Figure 12C


Cochrane & others 329
19
Sol. Sturgis 300
Carson & Morton's Hw 160
S.H.
W. B. Gillman 160
20
A. C. Lewis 160
J. W. Pennell 80
Geo. E. Page 80
C
I
Pudiv 42
E. Holton 164
A. S. Blackburn 80
A. C. Winslow 320
30
29
Pudiv 42
M. Skinner 80
C. B. Farwell 80
E. Bachellor 80
Johnstone & Cochrane 160
C. H. Buck 80
S.H.
Road
T. F. Baldwin 320
S. W. Plank
31
W. B. Ogden & Co. 640
32
G. W. Clarke 80
C. C. Colton 40
A. C. Lewis
Jas. Gamble 80
F. Dennison 80
OKSVILLE

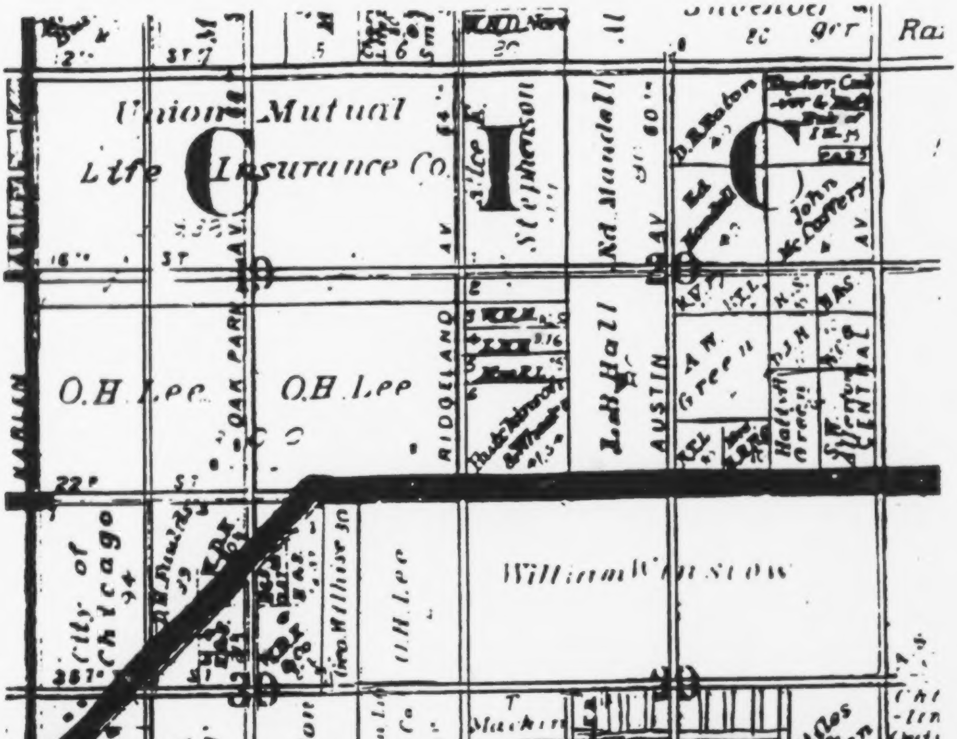
L. M. Snyder, Real Estate Map of Cook County, Illinois, 1886 (Figure 12D)

In 1880, Cicero's population was 5,182. All along the Burlington Railroad real estate development continued and various subdivisions appear on the map. The east-west streets in Cicero are numbered as they are in Chicago. Only the north-south streets have local names.

David A. Gage, city of Chicago treasurer from 1869 to 1873, owned considerable real estate outside of Chicago, including 225 acres of section 30 in Cicero. When Gage was blamed for a shortage of some $500,000 in city accounts, Chicago, in order to recoup some of its loss, seized some of Gage's property, including his Cicero holdings. Years later, the value of the land increased to more than $1 million and a lawsuit was filed by Gage's daughter to recover the difference between the value of the land and the money her father owed the city. Legal fights over this land continued well into the twentieth century.

During the 1950s, an arboretum existed on this site and the area was known as Gage's Farm. The city of Chicago eventually relinquished title to the land, and, subsequently, Morton West High School and a shopping center were built on what was formerly Gage's property.

Real Estate Map of Cook County, 1886 **Figure 12D**


Union Mutual Life Insurance Co.
C
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C
Stephenson
Nd. Mandall
D. B. Eaton
John McCaffery
OAK PARK AV
RIDGELAND AV
AUSTIN AV
CENTRAL AV
HARLEM
19
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O.H. Lee
O.H. Lee
L. H. Hall
A. W. Green
City of Chicago
O.H. Lee
William Winslow
Mark Skinner
S.W. Allerton
Greeley
CLYDE
Ogden Sheldon & Co.
Ogden Sheldon & Co.
Ogden Sheldon & Co.
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Jacob M. Eshleman
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Union Atlas Co., Atlas of the State of Illinois, 1876 (Figure 12E)

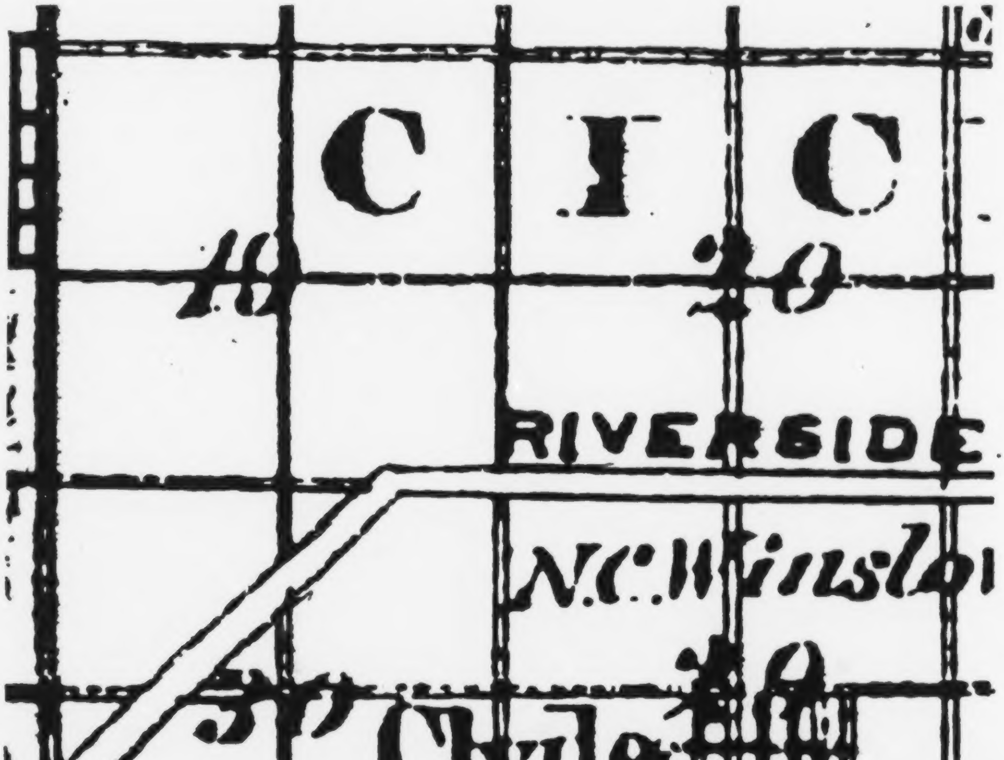
The Union Atlas contains many maps of Illinois and its counties, and even maps of significant European countries. At the back of the atlas is a history of Illinois; a discussion of the topography of the state, its climate, geology and schools; county histories; population statistics; biographical sketches of important persons in Illinois; and a directory of Illinois businesses. The atlas was probably supported by individual contributions, for a list of patrons is included.

Here the development of Cicero is seen differently than in the previous maps. While previous maps showed land ownership, the Union Atlas possesses very little information of that sort. Note, for example, that only the names N. C. Winslow and Ogden and Company appear on the map.

The Clyde subdivision, created in 1872, appears prominently, marked by an 80-acre site in section 29. Shortly thereafter, a railroad depot was constructed there by the Chicago, Burlington, and Quincy Railroad. Many of the earliest residents were employed by the railroad. The presence of a depot also made the area attractive for commuters who worked in Chicago.

LaVergne is indicated only by a station (its name does not appear). It was hoped the community would become ideal, exclusive in character, and highly desirable for those who wished to escape Chicago's congestion. The housing in this area remains strikingly different from that of Cicero to the east or Stickney to the south. An attempt was made from the beginning to maintain high building standards. Thus, though many of the houses in this area were constructed prior to 1900, they are still in excellent condition.

Union Atlas Co., Atlas of the State of Illinois, 1876 **Figure 12E**


CIC
19
20
RIVERSIDE
N.C. Winslo
30
Clyde
29
Sta
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32
Ogden & Co.

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United States Geological Survey Map, Survey of 1889-1899, Released in 1901 and Reissued in 1913 (Figure 12F)

Due to the desire of the U.S. government to produce an accurate map of the country, Congress created the U.S. Geological Survey in 1879. Since the 1880s, the Geological Survey has produced a series of uniform topographical maps showing relief, civil boundaries, township and range lines, and many cultural features like parks, schools, churches and railroads.

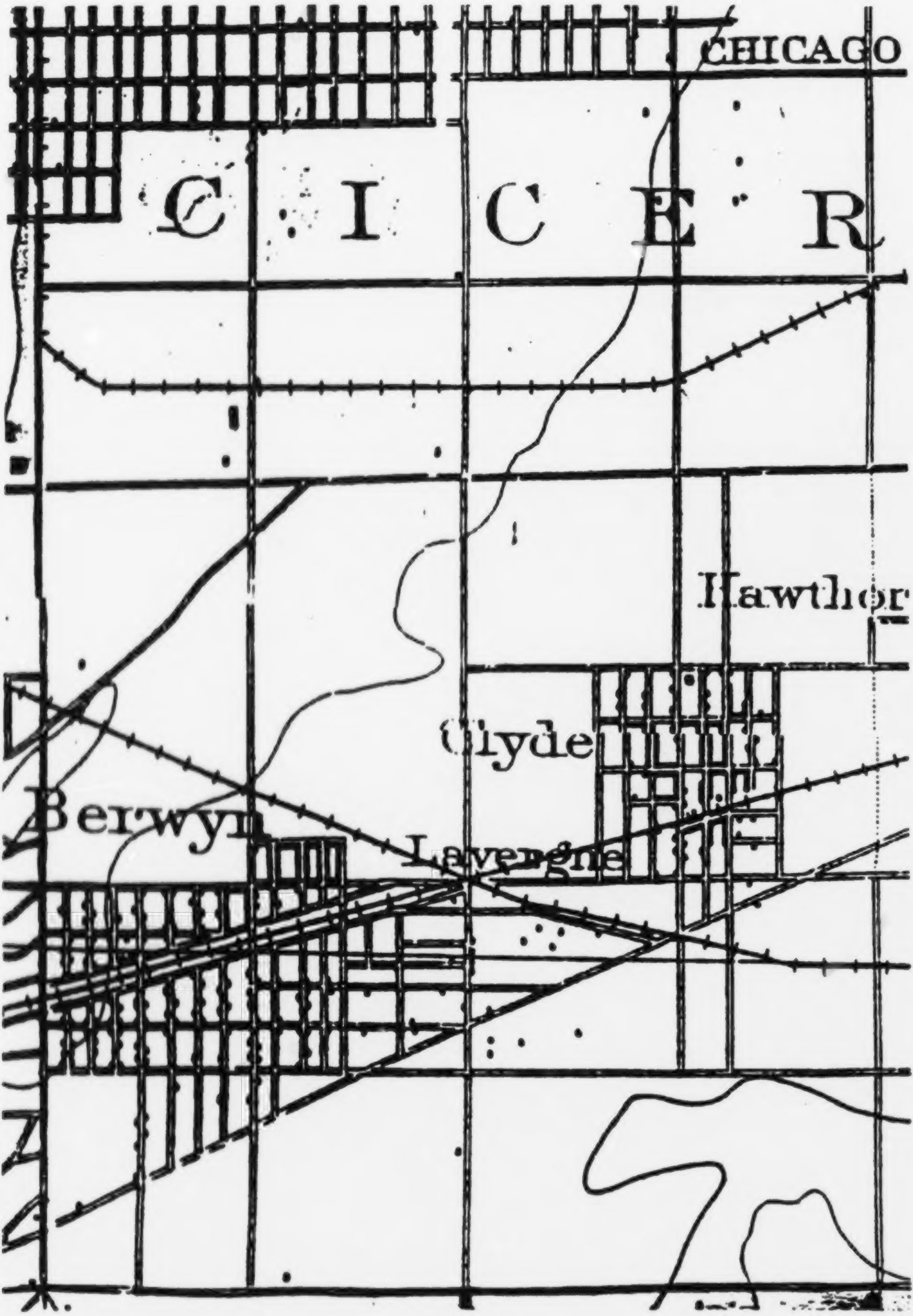
The map under consideration is the one made for Cicero during 1889, 1897, and 1899. The map was first issued in 1901. The one we are considering was reissued in 1913.

The contour lines on this map indicate that the entire area is sloping from the northwest toward the southeast, though the slope is a very gentle one.

As the result of an election held on December 1, 1901, Berwyn split from Cicero and was incorporated by the state of Illinois as a village. On June 6, 1908, it was incorporated as a city. Berwyn's population in 1910 is 5,841. In 1911, Berwyn Township was formed. In 1902, Oak Park voted to establish itself as an independent village. The six square miles of land left remained the Town of Cicero.

There is an unidentified railroad running between 22nd and 16th Streets (sections 21 and 22). Perhaps this is a spur of the Wisconsin Central Railroad—its main line crosses the city a little further toward the north.

United States Geological Survey Map **Figure 12F**


CHICAGO
C I C E R
Hawthor
Clyde
Berwyn
Lavergne

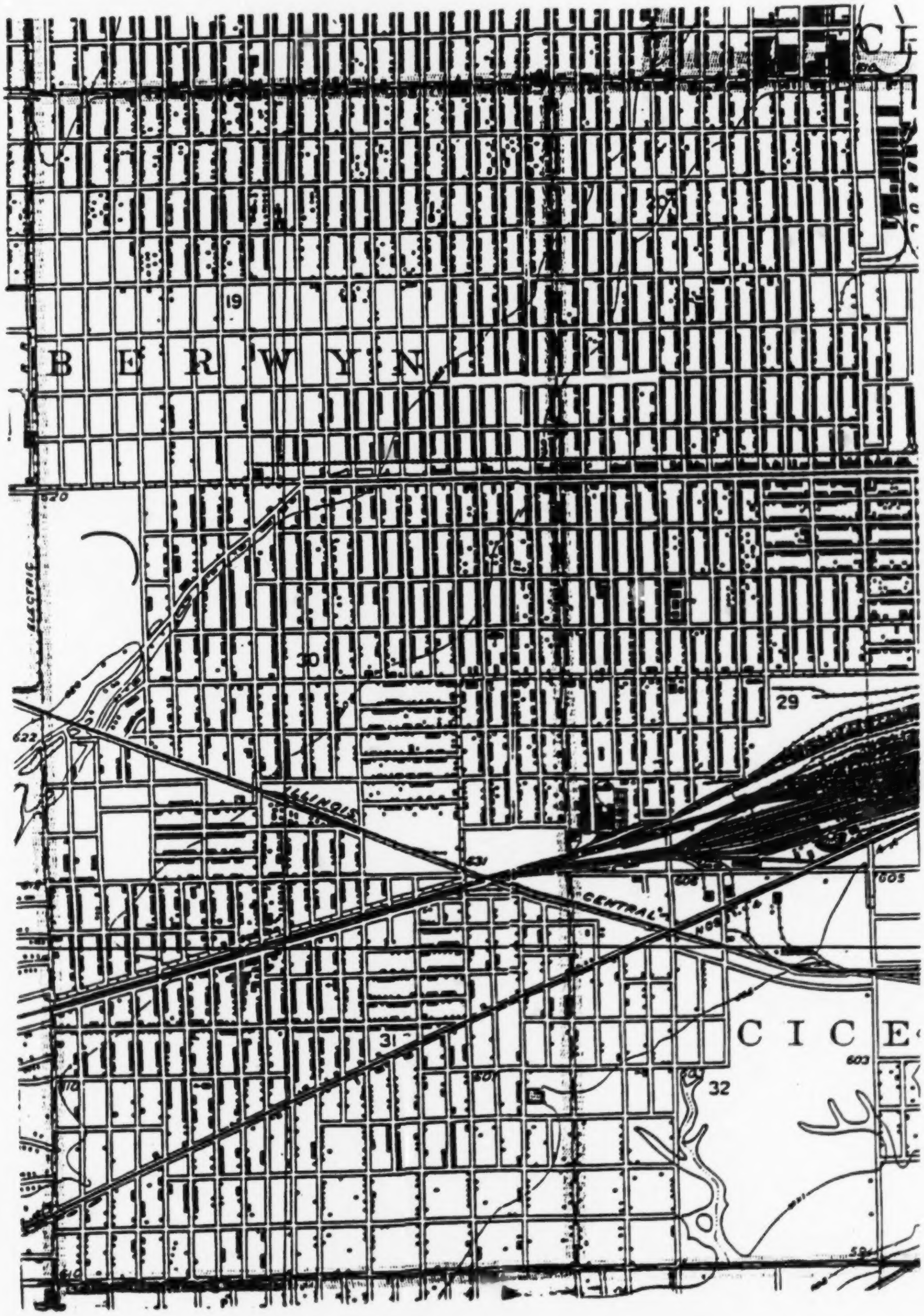
United States Geological Survey, 1928 (Figure 12G)

The USGS map for 1928 reveals more social information than the earlier one. The railroad in sections 19 and 20 is gone. There is greater real estate activity than any time in the past. Berwyn's population in 1920, at 14,150, increased 240 percent over 1910. Most of Berwyn's present housing stock was constructed during this period. Housing is sturdy, attractive, and considered better than that of surrounding areas. All parts of Berwyn show some construction activity, except for the west halves of sections 19 and 30. By 1930, there was very little vacant land left in Berwyn.

Many newcomers to Berwyn are from Europe. Swedes settled in an area bounded by the Chicago, Burlington and Quincy Rail Road, East Avenue, Oak Park Avenue, and the Illinois Central Railroad, and named their area Upsala. Czechs and Slovaks settled between the ICRR and 16th Street in an area known as Little Bohemia. Far to the north, along 12th Street, were the Dutch. In addition, a sizeable number of Germans lived throughout the city. By 1930, the Czechs, Slovaks and Germans made up 48 percent of Berwyn's population.

By 1930, Berwyn's population reached 47,027. Berwyn was a reasonably well-developed city by this time. Excellent rapid transit and train routes to Chicago accelerated its development. The large industrial base in nearby Cicero provided employment for its citizens. It seemed that every family in Berwyn had at least one member working at Western Electric. Berwyn's growth, however, is soon retarded by the Great Depression of the 1930s.

United States Geological Survey, 1928 **Figure 12G**


BERWYN
19
30
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31
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ELECTRIC
ILLINOIS
CENTRAL
CICE
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622
610
603
605
608
631

United States Geological Survey, 1963 (Figure 12H)

The USGS map for Berwyn and the west end of Cicero shows cultural features that did not appear on past USGS maps—churches, schools, playgrounds, parks, and post offices. Morton West High School, built in 1959, is shown on the old Gage Farm tract in section 30, sharing the area with a shopping mall.

A major employer, MacNeal Memorial Hospital, is in section 31. A number of schools, indicating the presence of Roman Catholics in the community, dot the area; namely, St. Mary, St. Odilo, and St. Leonard.

Mraz Park, in section 30; Janura Park, in section 31; Komensky School, in section 29; and Havlicek School, in section 19, indicate the Czech and Slovak presence in the city.

Piper School, in section 30, and LaVergne School, in section 31, reflect the city's history. Charles E. Piper was influential in the development of the area and LaVergne School was the first school built in this area of Cicero.

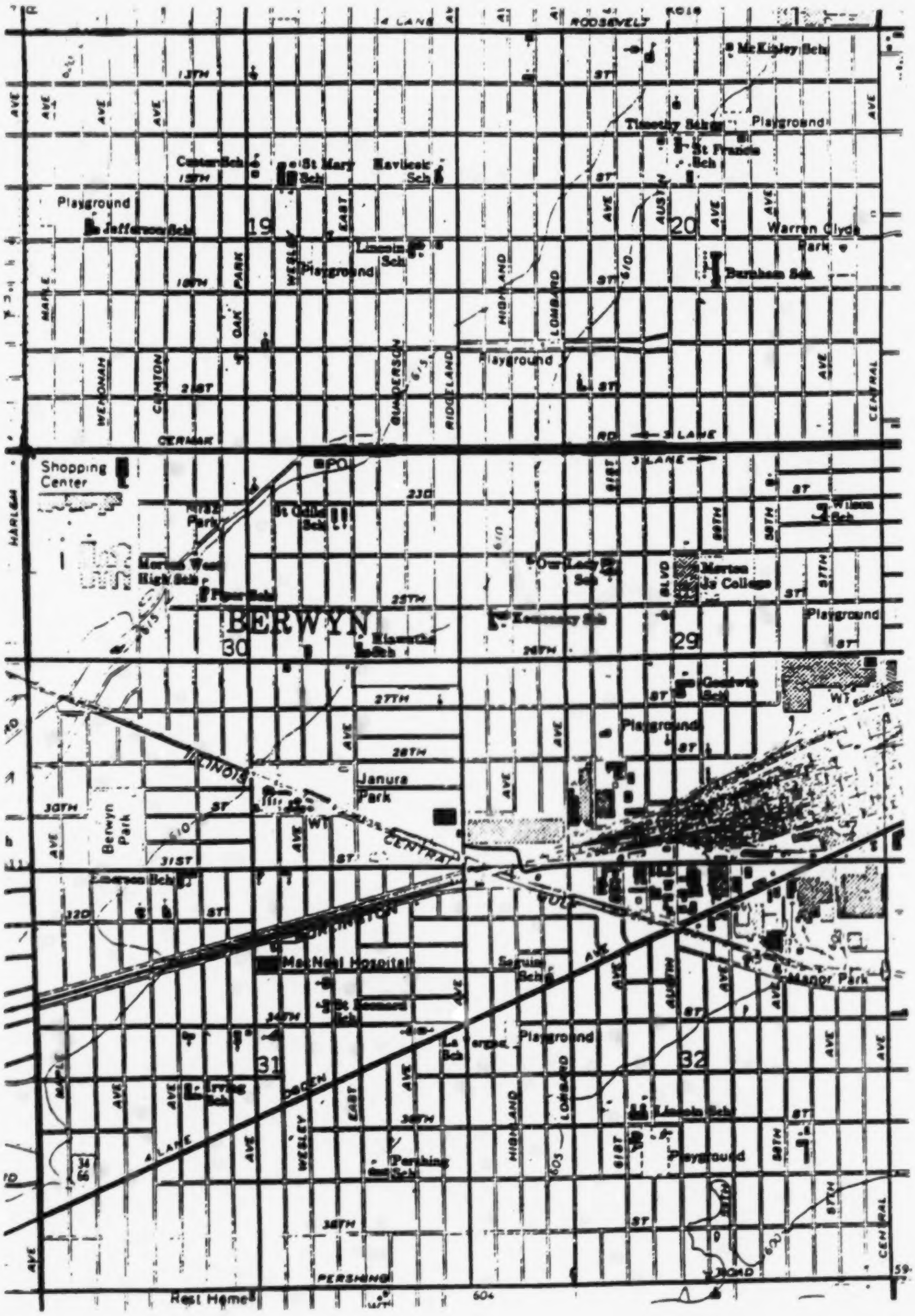
The Seguin School, an institution for mentally handicapped children, is in section 32.

In the Cicero section of the map, note Timothy Christian High School in section 20. This was a Dutch Reformed Church school, symbolic of the heavy Dutch influence in the north of Berwyn and Cicero. J. Sterling Morton High School, built in 1903, is located in section 29, along with Morton Junior College. Morton College was reorganized during the 1970s and, in 1975, located at its present site at 39th Street and Central Avenue.

More recently, Berwyn's population has peaked and declined. Its figures for 1950-1990 are as follows:

1950	51,280
1960	54,224
1970	52,502
1980	48,849
1990	45,426

United States Geological Survey, 1963 **Figure 12H**


ROOSEVELT
4 LANE
McKinley Sch
13TH
ST
Timothy Sch
Playground
St Francis Sch
Center Sch
St Mary Sch
Havlicek Sch
15TH
Playground
Jefferson Sch
19
20
Warren Clyde Park
Lincoln Sch
Playground
Burnham Sch
16TH
MAPLE
AVE
OAK
PARK
WESLEY
EAST
HIGHLAND
LOMBARD
AUSTIN
WENONAH
CLINTON
GUNDERSON
RIDGELAND
CENTRAL
Playground
21ST
CERMAK
RD
3 LANE
Shopping Center
HARLEM
PO
23D
Park
St Odilo Sch
Morton West High Sch
Piper Sch
61ST
60TH
58TH
57TH
Wilson Sch
Our Lady Sch
BLVD
Morton Jr College
25TH
BERWYN
30
Hiawatha Sch
Komensky Sch
26TH
29
Playground
Goodwin Sch
WT
27TH
28TH
Playground
ILLINOIS
CENTRAL
Janura Park
30TH
Berwyn Park
WT
31ST
Emerson Sch
32D
BURLINGTON
MacNeal Hospital
Sequin Sch
Manor Park
St Leonard Sch
34TH
La Vergne Sch
Playground
31
32
OGDEN
Irving Sch
Lincoln Sch
4 LANE
36TH
Pershing Sch
Playground
38TH
PERSHING
ROAD
Rest Home
604
605

Conclusion

When Township 39 north of the base line, range 13 east of the 3rd Prime Meridian, was surveyed many years ago, the area was flat, marshy, and considered unattractive. In 160 years the area was transformed from a place people traveled across to go somewhere else to a series of sizeable, productive communities. Change began with the U.S. government's plan to create a rational method for establishing land claims by surveying the land and creating a series of square townships.

Enterprising men like William Butler Ogden, Henry Austin, and Thomas Baldwin drained the swamps, built roads, railroads, and a canal. If the pioneer settlers were to return, they would not recognize the place. A large industrial and commercial complex surrounded by homes, churches, parks, playgrounds, schools, and other cultural institutions has taken the place of the wetlands, prairies, and groves that flourished in the 1830s.

About 22 square miles of the old Cicero Township are now in Chicago while the suburbs of Oak Park, Berwyn, and Cicero take up the rest of the area.

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Newspaper Clippings, Cicero Public Library.

Appendix A

Maps and the Teaching of History: Seven Ways to Use Them in Instruction

1. **Sequence and change.** Use a sequence of maps of one locality to show change over time (the course of a military campaign, the expansion of an empire, the diffusion of a technology, etc.)

2. **Size as power.** The extent of a region indicates its relative power. A cartogram of the electoral college is a prime example of this type of instructional device.

3. **Distribution.** Thematic maps establish certain types or categories and show their spatial distribution. The extent of Christianity in 400 A.D. or the location of underdeveloped economies in 1970 A.D. are two examples.

4. **Movement.** Use arrows or other design elements to indicate the movement of people, goods, ideas, or historical developments from one place to another.

5. **Routes: the pathways of history.** Lines drawn on a map suggest routes over which movement or exchange might take place. The symbols designate either a specific artifact like the Trans-Siberian Railroad or generalized channels of flow such as the Silk Route to China.

6. **Spatial context.** The geographical context in which historical events and developments take place is developed by maps with general reference features. Using different types of maps with various scales, subjects, and orientations will enrich this dimension and lead to fresh insights.

7. **Relative location.** Every place has a specific location and site. In addition, it also has a situation in the surrounding geographical context and a location relative to other places. Students should be able to locate significant places on a world map and to describe their situation or relative location in respect to continents, the world ocean, major landforms, climate, relative population density, and patterns of land use.

Appendix B

Maps and the Teaching of History Ten Propositions

1. Maps are not just illustrations of the earth's surface, they are foci for modes of thought.

2. One can view a map as either a piece of the universe or as a portion of the surface of the globe.

3. All maps are capable of many readings. They contain more than one message.

4. One of the striking functions of maps is that they can put together things that we do not usually consider connected. Cartography serves an integrative function.

5. Maps are transmitters of culture in both deliberate and passive ways. They clarify social and cultural purposes.

6. Maps are mirrors of culture at the particular time and place they were made. They indicate something about the knowledge and beliefs of their makers. Maps are produced by communities of interest.

7. The rhetorical function of maps, like all rhetorical devices, is to induce cooperation, to persuade. (See Kenneth Burke)

8. The problem with maps is that "no single conceptual mechanism can account for the diversity of forces at work in shaping an environment or a locational pattern." (James Vance, *The Geography of Wholesaling*, 1970, p. 127).

9. Maps give us a chance to express what we think.

10. Critics complain that our mental maps are untidy and in constant flux, but the real world shares these characteristics. Maybe maps are the real villains because they present a deceiving picture of a neat, precise, simple, and ordered world.

Appendix C

Maps as Primary Sources: Some Suggestions for Interpretation

A. The map in its setting
   1. Who made it?
   2. For what purpose?
   3. For whom? For what audience?
   4. When was it made?
   5. Where was it made?
   6. What sources were used to make it?

B. The form of the map: How was it made?
   1. Manuscript or published map
   2. The type of publication
   3. Design characteristics
   4. Accuracy
   5. Technical quality

C. The map in its families: Categories
   (The importance of seeing a map as one of a group)
   1. Of place
   2. Of date
   3. Of maker and/or publisher
   4. Of function
   5. Of audience

D. The map in its individuality
   1. Historic associations
   2. Changes on the map
   3. Provenance
   4. How the map has been regarded over time

E. Reading the map: Basic elements
   1. Direction, orientation
   2. Scale
   3. Symbols, legend
   4. Grid system
   5. Projection

F. Reading the map: Analysis

1. Center and edges
2. Land and water
3. Boundaries and districts
4. Place names and nomenclature patterns
5. Landmarks and hierarchies
6. Landforms
7. Routes
8. Land-use
9. Decorative

G. Reading the map: contexts

1. The place in general narratives
2. Its role as a transmitter of culture
   a. Explicit aspects
   b. Implicit aspects
3. Its original social context: How was the map used?
4. Its meaning for today
   a. General social value
   b. Personal reactions

Appendix D

Cartographic Traditions in the History of Western Civilization:

A Syllabus

I. The History of Cartography as a Field of Study

The definition of a map and an investigation of its elements. The relationship between culture and cartography. An introduction to general works and reference tools in the field.

Readings

Lloyd A. Brown, *The Story of Maps* (Boston: Little Brown and Company, 1950), 1-11.

R. A. Skelton, *Maps: A Historical Survey of Their Study and Collecting* (Chicago: The University of Chicago Press, 1972).

J. B. Harley and David Woodward, "Why Cartography Needs Its History," *American Cartographer,* 16:1 (January, 1989), 5-15.

John Noble Wilford, *The Mapmakers* (New York: Knopf, 1981), pp. 7-14.

David Greenhood, *Mapping* (Chicago: The University of Chicago Press, 1964), *passim.*

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Erwin Raisz, *Principles of Cartography,* (New York: McGraw Hill, 1962), 1-10.

Erwin Raisz, "Time Charts of Historical Cartography," Imago Mundi, 2 (1937), 9-16.

Arthur H. Robinson, *et al., Elements of Cartography,* 5th ed. (New York: John Wiley & Sons, 1984), *passim.*

David Woodward, "The Study of the History of Cartography: A Suggested Framework," *American Cartographer,* 1:2 (October, 1974), 101-115

II. The Use of Maps as Texts

Historical perspectives on cartographic sources. The importance of context in using maps and documents. Relating maps to society and culture as well as the earth and its landscapes.

Readings

David Woodward, "The Form of Maps: An Introductory Framework," *AB Bookman's Yearbook,* Part I, (1976), pp. 101-115.

Howard Deller and Mark Schug, "How to Use Old Maps to Enliven Social Studies," *The Social Studies*, 80:2 (March/April 1989), pp. 45-50.

Brian Harley, "Maps, Knowledge, and Power," in *The Iconography of Landscape*, edited by Denis Cosgrove and Stephen Daniels, (Cambridge: Cambridge University Press, 1988), pp. 277-312.

Hilary Lambert Renwich and Susan Cutter, "Map Postcards and Images of Place," *Landscape*, 27:1 (1983), pp. 30-38.

Reading Maps as Texts

Maps as windows to a historical setting as well as images of reality. Maps as mirrors of the earth's surface and as rhetorical documents. The various contexts needed to place maps into perspective: the cartographic, cartobibliographic, and social-cultural contexts. The relationship between art history and the history of cartography.

Required Reading

David Buisseret and Gerald A. Danzer, *Discovering Western Civilization Through Maps and Views* (New York: HarperCollins, 1991), 1-12 and *passim*.

J. B. Harley, "Texts and Contexts in the Interpretation of Early Maps," in David Buisseret, ed., *From Sea Charts to Satellite Images* (Chicago: The University of Chicago Press, 1990), 3-15.

Recommended Reading

M. J. Blakemore and J. B. Harley, "Concepts in the History of Cartography: A Review and Perspective," *Cartographica* 17:4 (Winter 1980), 1-120. Monograph 26.

J. B. Harley, "Deconstructing the Map," *Cartographica*, 26: 2 (1989), 5-15 and the discussion in succeeding issues.

J. B. Harley, "Maps, Knowledge and Power," in *The Iconography of Landscape*, ed. by Denis Cosgrove and Stephen Daniels (Cambridge: Cambridge University Press, 1988), 277-312

Arthur H. Robinson and Barbara Bartz Petchenik, *The Nature of Maps: Essays Toward Understanding Maps and Mapping* (Chicago: The University of Chicago Press, 1976), 1-42.

III. Maps Before the Written Word

The cartographic images left by preliterate peoples in Europe, the Near East, and North Africa. The tentative nature of current interpretations of these materials. The power of the circle and the grid.

Readings

Jacquetta Hawkes, ed., *Atlas of Ancient Archaeology* (New York: McGraw-Hill, 1974), *passim*.

James Mellaart, *Çatal Hüyük: A Neolithic Town in Anatolia* (New York: McGraw-Hill, 1967).

Catherine Delano Smith and G. Malcolm Lewis, "Cartography in Prehistoric Europe and the Mediterranean," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 43-102.

Maps for Detailed Analysis

1. Çatal Hüyük, c. 6200 B.C.
2. Triora (Italy) Stele Decoration
3. Capo di Ponte (Italy) petroglyphs

IV. Origins of Mapmaking: Mesopotamia and Egypt

Urban plans and regional maps in Mesopotamia. The Babylonian World Map of the sixth century B.C. The Turin Papyrus Map. Biblical images of the world.

Readings

Carmen Blacker and Michael Loewe, eds., *Ancient Cosmologies* (London: George Allen and Unwin, 1975), esp. 42-65.

Samuel Noah Kramer, *History Begins at Sumer*, 3rd ed. (Philadelphia: University of Pennsylvania Press, 1981), 375-379.

A. R. Millard, "Cartography in the Ancient Near East," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 107-116.

N. M. Sarna, *Understanding Genesis* (New York: Schoeken Books, 1970), passim.

A. F. Shore, "Egyptian Cartography" in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 117-129.

Eckard Unger, "From the Cosmos Picture to the World Map," *Imago Mundi*, II (1937), 1-7.

Maps for Detailed Analysis

1. "An Agricultural Region Near Nippur," c. 1500 B.C. (clay tablet)
2. Plan of Nippur, c. 1500 B.C. (clay tablet)
3. Turin Papyrus Map, c. 1200 B.C.
4. Babylonian World Map, c. 600 B.C. (clay tablet)

V. Classical Greek Cartography

The earth takes shape: Scientific approaches to cartography. Claudius Ptolemy and the classical heritage.

Readings

Germaine Aujac and O. A. W. Dilke, et al., "Cartography in Ancient Europe and the Mediterranean," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 130-200.

Lloyd A. Brown, *The Study of Maps* (Boston: Little, Brown and Company, 1950), 12-80.

John Noble Wilford, *The Mapmakers* (New York: Knopf, 1981), 15-33.

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G. R. Crone, "Epic Work of Claudius Ptolemy," *Geographical Magazine*, 44 (October, 1971), 23-30.

O. A. W. Dilke, *Greek and Roman Maps* (London: Thames and Hudson, 1985), 21-86.

A. E. M. Johnston, "The Earliest Preserved Greek Map: A New Ionian Coin Type," *Journal of Hellenic Studies*, 87 (1967), 86-94 and plates IX-XI.

J. L. Myres, "An Attempt to Reconstruct the Maps Used by Herodotus," *Geographical Journal*, 8 (1896), 605-631.

Edward Luther Stevenson, trans., *Geography of Claudius Ptolemy* (New York: New York Public Library, 1932), *passim*.

Maps for Detailed Analysis

1. Herodotus: A reconstruction of his World Map, c. 450 B.C.
2. "The Region about Ephesus," a Greek coin, c. 360 B.C.
3. Eratosthenes: A reconstruction of his World Map, c. 240 B.C.
4. Claudius Ptolemy, World Map (Rome edition, 1478).

VI. Roman Cartography

Roman surveying and systems of land division. Maps and the Roman Empire. The Peutinger Table.

Readings

O. A. W. Dilke, "Cartography in Ancient Europe and the Mediterranean," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 201-257.

G. R. Crone, *Maps and Their Makers*, 5th ed. (Hamden, Connecticut: Archon Books, 1978), 1-10.

O. A. W. Dilke, *Greek and Roman Maps* (London: Thames and Hudson, 1985), 87-129.

O. A. W. Dilke, *The Roman Land Surveyors: An Introduction to the Agrimensores* (Newton Abbot: David and Charles, 1971), *passim*.

Kenneth Nebenzahl, *Maps of the Holy Land* (New York: Abbeville Press, 1986), 14-27.

Maps for Detailed Analysis

1. Peutinger Map: Central Mediterranean
2. Peutinger Map: Eastern Mediterranean
3. Macrobius, "Map of the World"

VII. Early Medieval Maps

Early Christian maps. The blend of classical traditions, Biblical images, and the needs of faith.

Readings

Walter Brueggemann, *The Land: Place as Gift, Promise, and Challenge in Biblical Faith* (Philadelphia: Fortress Press, 1977).

George Ferguson, *Signs and Symbols in Christian Art* (London: Oxford University Press, 1954).

Catherine Delano Smith, "Geography or Christianity? Maps of the Holy Land Before A.D. 1000," *Journal of Theological Studies*, 42 (April, 1991), 143-152.

Maps for Detailed Analysis

1. St. Jerome, "Map of the Near East," c. 385 A.D.
2. Isidore of Seville, "Diagram of the Inhabited World"
3. Beatus, "The Corners of the Earth"

VIII. Byzantine and Islamic Cartography

Maintaining classical traditions. Christian cartography in the Eastern tradition. The rise of Islamic cartography. Al-Idrisi and the Sicilian geographers.

Readings

O. A. W. Dilke, "Cartography in the Byzantine Empire," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987-), I, 258-275.

Frances Gies, "Al-Idrisi and 'Rogers Book,'" *Aramco World Magazine* 28:4, (July-August, 1977), 14-19.

Leo Bagrow, *History of Cartography*, revised by R. A. Skelton (Chicago: Precedent Publishing Company, 1985), 53-58.

Aubrey Diller, "The Oldest Manuscripts of Ptolemaic Maps," *Transactions of the American Philological Association*, 71 (1940), 62-67.

Konrad Miller, *Mappae Arabicae* (Stuttgart: K. Miller 1929-1931), vol IV.

Maps for Detailed Analysis

1. Cosmos Indicopleustes, "Map of the World" c. 548 A.D.
2. Al-Idrisi, World Map from "The Garden of Joys," 1154 A.D.
3. Idrisi-Atlas variants (Konrad Miller, 1927 compilation)

IX. European Mapping in the Middle Ages: Mappaemundi

The nature of mappaemundi. The T-O format and its variants. Time and space in medieval cartography. Macrobius. The Hereford Map.

Readings

John Noble Wilford, *The Mapmakers* (New York: Knopf, 1981), 34-55.

David Woodward, "Medieval Mappaemundi," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 286-370.

Lloyd A. Brown, *The Study of Maps* (Boston: Little, Brown and Company, 1950), 81-112.

G. R. Crone, "New Light on the Hereford Map," *Geographical Journal*, 131 (December, 1965), 447-462.

Marcel Destombes, ed., *Mappaemundi, A.D. 1200-1500* (Amsterdam: N. Israel, 1964), *passim*.

George H. T. Kimble, "Maps in the Middle Ages," in his *Geography in the Middle Ages* (London: Methuen, 1938), 181-204.

David Woodward, "Reality, Symbolism, Time and Space in Medieval World Maps," *Annals of the Association of American Geographers*, 75 (1986), 61-76.

Maps for Detailed Analysis

1. Beatus, "Four Corners of the Earth" 787 A.D.
2. The Anglo-Saxon Map of the World, c. 995 A.D.
3. The Psalter World Map of the 13th Century
4. The Hereford Map, c. 1275 A.D.

X. European Mapping in the Middle Ages: Local and Regional Cartography

Maps of estates and towns, itineraries, and portolan charts. Medieval concepts of space. Early strip maps. Artistic portrayal of towns.

Readings

Tony Campbell and P. D. A. Harvey, "Cartography in Medieval Europe and the Mediterranean," in J. B. Harley and David Woodward, eds., *The History of Cartography* (Chicago: The University of Chicago Press, 1987), I, 371-501.

G. R. Crone, "The Evolution of the Medieval Sea Chart," in his *Maps and Their Makers*, 5th edition (Hamden, Connecticut: Archon Books, 1978), 10-17.

Kenneth Nebenzahl, *Maps of the Holy Land* (New York: Abbeville Press, 1986), 28-69.

E. J. S. Parsons, *The Map of Great Britain, c. A.D. 1360 known as the Gough Map* (Oxford: Oxford University Press, 1958), a facsimile with an introduction.

R. A. Skelton and P. D. A. Harvey, eds., *Local Maps and Plans from Medieval England* (Oxford: Clarendon Press, 1986), *passim*.

Edward Luther Stevenson, *Portolan Charts: Their Origin and Characteristics* (New York: Knickerbocker Press, 1911), *passim*.

Richard Vaughan, *Matthew Paris* (Cambridge: Cambridge University Press, 1958).

Heinrich Winter, "Catalan Portolan Maps and Their Place in the Total View of Cartographic Development," *Imago Mundi*, 11 (1954), 1-12.

David Woodward, "Roger Bacon's Terrestrial Coordinate System," *Annals of the Association of American Geographers*, 80:1 (March, 1990), 109-122.

Maps for Detailed Analysis

1. A Crusader Map of Jerusalem, twelfth century.
2. Matthew Paris, Itinerary from London, c. 1253 A.D.
3. The Portolan Chart of Angellino de Dalorto, 1325 A.D.

XI. The Rediscovery of the Ptolemaic Maps

The spread of Greek texts to the West. Renaissance cartography, manuscript and printed versions of Ptolemy's maps in the West. The Ptolemaic tradition and the development of modern maps.

Readings

G. R. Crone, "The Revival of Ptolemy," in his *Maps and Their Makers*, 5th ed. (Hamden, Connecticut:: Archon Books, 1978), 35-42.

O. A. W. Dilke and M. S. Dilke, "The Imprint of Ptolemy," *The Geographical Magazine* 57:10 (October, 1985), 544-549.

Samuel Y. Edgerton, Jr., "From Mental Matrix to Mappaemundi to Christian Empire: The Heritage of Ptolemaic Cartography in the Renaissance," in David Woodward, ed., *Art and Cartography: Six Historical Essays* (Chicago: The University of Chicago Press, 1987), 10-50.

A. E. Nordenskiöld, *Facsimile-Atlas to the History of Cartography* (New York: Dover Publications, 1973), 1-29, 52-61.

Walter Oakeshott, "Some Classical and Medieval Ideas in Renaissance Cosmography," in *Fritz Saxl Memorial Essays*, ed., by D. J. Gordon (London: T. Nelson, 1957), 2.

Rodney W. Shirley, *The Mapping of the World: Early Printed Maps*, 1472-1700 (London: Holland Press, 1983), *passim*.

Maps for Detailed Analysis

1-4. World Maps from Ptolemy's Geographia
1. Bologna, 1477
2. Rome, 1478
3. Ulm, 1486
4. Venice, 1511
5. Henricus Martellus, World Map, 1489

XII. European Cartography on the Eve of the Discoveries

Early printed maps. Their social and cultural contexts. The persistence of traditional images. Competing world views and cartographic solutions.

Readings

G. R. Crone, "Fifteenth-Century World Maps: Fra Mauro and Martin Behaim," in his *Maps and Their Makers*, 5th ed. (Hamden, Connecticut: Archon Books, 1978), 27-34.

Gerald A. Danzer, *Cartographic Images of the World on the Eve of the Discoveries* (Chicago: Newberry Library, 1988), 1-30.

Lloyd Arnold Brown, *The World Encompassed* (Baltimore: Walters Art Gallery, 1952), *passim*.

Tony Campbell, *The Earliest Printed Maps*, 1472-1500 (Berkeley: University of California Press, 1987), *passim*.

Gerald A. Danzer, *Images of the Earth on Three Early Italian Woodcuts* (Chicago: Newberry Library, 1991), 1-21.

Rodney W. Shirley, *The Mapping of the World: Early Printed Maps, 1472-1700* (London: Holland Press, 1983), passim.

Maps for Detailed Analysis

1. "The Last Judgement" (c. 1450-1460).
2. "The Meeting of St. Francis and St. Dominic" (c. 1460-1480).
3. "St. Augustine" (c. 1460-1470).
4. Diagram of the World from Isidore of Seville (1472).
5. World Map from the *Rudimentum Novitiorum* (1478).
6. World Map from Ptolemy, *Geographica* (Rome, 1478).
7. World Map by Hanns Rüst
8. World Map: Ambrosius Macrobius, *In Somnium Scipionis* (1483).
9. The Composite World Map from Venice (c. 1485).

XIII. Columbus and His Maps, and the Cartography of the Discoveries

Geographic knowledge in the late fifteenth century. The maps used by Columbus. His interpretation of these maps. Mapping the discoveries.

Readings

G. R. Crone, "The Cartography of the Great Discoveries," in his *Maps and Their Makers* (Hamden, Connecticut: Archon Books, 1978), 43-55.

J. B. Harley, *Maps and the Columbian Encounter* (Milwaukee: Golda Meir Library, 1990), 1-160.

John Noble Wilford, *The Mapmakers* (New York: Knopf, 1981), 56-72.

H. B. Johnson, *Carta Marina: World Geography in Strassburg*, 1525 (Minneapolis: University of Minnesota Press, 1974).

Kenneth Nebenzahl, *Atlas of Columbus and the Great Discoveries*, Elizabeth Fagan and Jon Levereaux eds., (Chicago: Rand McNally, 1991).

George E. Nunn, *The Geographical Conceptions of Columbus* (New York: American Geographical Society, 1924), *passim*.

J. H. Parry, *The Discovery of the Sea* (New York: Dial, 1974).

R. A. Skelton, *Explorers' Maps: Chapters in the Cartographic Record of Geographical Discovery*, 2nd ed. (Feltham, N. Y.: Spring Books, 1970).

Maps for Detailed Analysis

1. Pizzigano Portolan Chart, 1424
2. Vinland, c. 1440
3. Ptolemy (Rome), 1472

4. Behaim globe gores, 1492
5. Rosselli, 1492-1493
6. Columbus, "La Española," 1492-1493
7. La Cosa, 1500
8. Cantino, 1502

XIV. Technology, Exploration, and Cartography in the Context of the Transatlantic Encounter

The reciprocal relationships between technological advance, geographical exploration, and the development of the modern map.

Readings

G. R. Crone, "Hydrographic Charts and Atlases," in his *Maps and Their Makers* 5th ed. (Hamden, Connecticut: Archon Books, 1978), 63-73.

J. B. Harley, *Maps and the Columbian Encounter* (Milwaukee: Golda Meir Library, 1990), 1-160.

J. H. Parry, "Charts and Maps," in his *The Age of Reconnaissance* (Berkeley: University of California Press, 1981, 100-113.

H. B. Johnson, *Carta Marina: World Geography in Strassburg*, 1525 (Minneapolis: University of Minnesota Press, 1974).

A. E. Nordenskiöld, Periplus: *An Essay on the Early History of Charts and Sailing Directions* (Stockholm: P. A. Norstedt, 1897), *passim*.

Eva G. R. Taylor, *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook* (London: Hollis and Carter, 1956).

Maps for Detailed Analysis (World Maps)

1. La Cosa (1500)
2. Contarini (1506)
3. Waldseemüller (1507)
4. Ptolemy, Strassburg ed. (1522)
5. Ribero (1529)

XV. The Development of Early Atlases

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2. Ortelius-Galle World Map, 1574.
3. Mercator, World Map, 1587.
4. Ortelius, World Map 1589.
5. Ortelius, Miniature World Map, 1601.
6. Mercator, Polar Map, 1606.

7-8. *Civitatus Orbis Terrarum:* Views of Seville and Danzig

XVI. Cartographic Developments during the Enlightenment

The technical development of large-scale maps. National mapping programs. Regional and local maps. Urban plans and estate maps. Thematic maps. Cartography at the service of the modern state.

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3. Reclaimed Land in the Netherlands, 1712
4. Versailles, c. 1765

XVII. Nationalism, the State, and Cartography

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2. Map of France showing postal routes, 1632
3. Map of the New French Departments

XVIII. The Industrial Revolution and the Use of Maps

Triangulation and the development of surveying techniques. Patterns of land division. Thematic mapping. Urban maps and views. The railroads and transportation maps. Carto-statistical research techniques. Maps for the millions: Advances in printing.

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2. A French Map of the Canals in England, 1819
3. Railroads: Dublin region, 1837
4. Plan of Vienna, 1858
5. Industrial Production, 1870-1880
6. London Taverns, c. 1885
7. Housing Conditions in Old Westminster, 1899

XIX. Mapping the Americas

Maps of the Americas used to illustrate major themes in the development of scientific cartography and the characteristics of modern civilization. Outlining the continents, mapping the interior, the variety of cartographic approaches used to illustrate spatial relationships.

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2. The Town of Secota, 1585
3. John Smith's Map of Virginia, 1612
4. William Penn's Plan for Philadelphia, 1683
5. The Interior of North America, 1718
6. America and Asia, 1764
7. L'Enfant's District of Columbia, 1792
8. John Melish, Map of the United States, 1818
9. New York City, 1876
10. Edison's Estate and Neighborhood, c. 1890
11. A View of the Nation in 1910

XX. The Development of Cartography in the Twentieth Century

International cooperation in mapping. Aerial photography and remote sensing. Official maps in series, National atlases and reference maps. Modern cartographic techniques. Cartography and computers. Maps and current events.

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4. The World After 1945
5. Open Skies in the Northern Hemisphere
6. Western Europe: Industrial Location and Economic Potential, 1969
7. Frankfurt, 1983 (Bollmann)
8. A World of Threats, 1989

XXI. The Debate Over Global Projections

The Mercator Projection as the standard map and its limitations. Interrupted projections. R. Buckminster Fuller's dymaxion airocean world map. The Peters and Robinson projections.

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2. Miller Cylindrical
3. Goode's Interrupted
4. Fuller
5. Peters
6. Robinson

XXII. Curricular Implications of Cartographic Sources

Maps as texts and the inquiry approach to instruction. Strategies for the analysis of cartographic materials. Map reading and map interpretation. Maps and the teaching of history: pedagogic functions.

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